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VOLUME XX NUMBER 11

SPECIAL FEATURES

AMERICAN AIRCRAFT ENGINE DEVELOPMENT

CUTTING FUEL COST IN AIR TRANSPORT

TRAVEL AIR HANGAR

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MARCH 15, 1926

AVIATION

VOL. XX, NO. 11

Published every Monday

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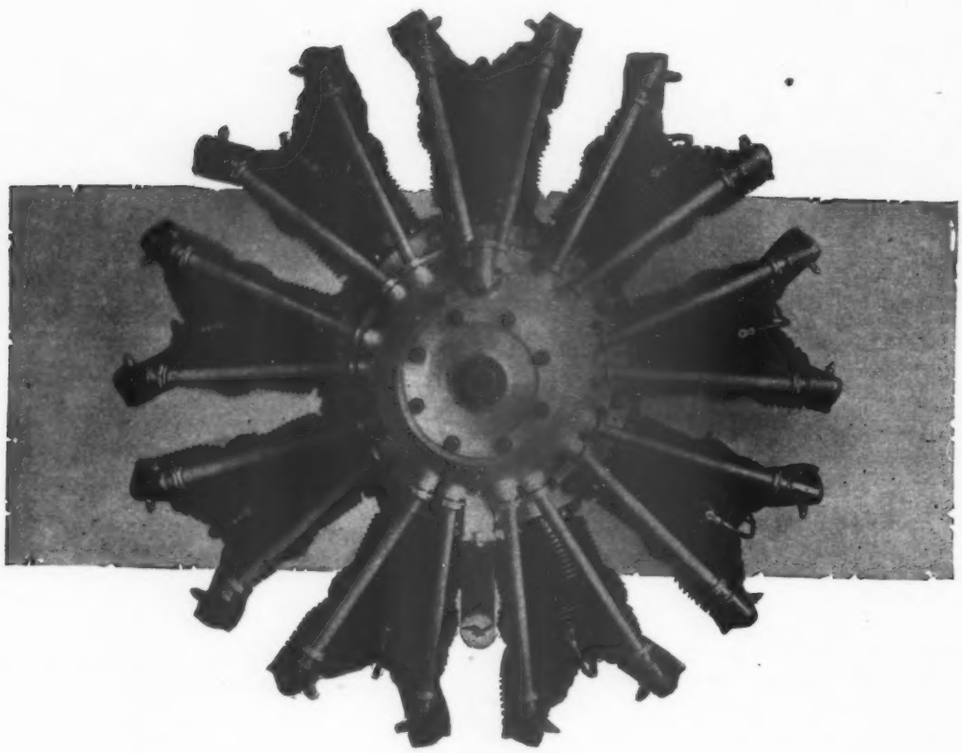

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CONTRIBUTORS

VOL. XX MARCH 15, 1926 No. 11

Money But No Reorganization

FROM THE developments in Washington it appears to be almost certain that the only immediate result of all the investigations and boards that have reported on governmental air activities will be to give the services more money to spend and perhaps a slight increase in personnel.

As this outcome has been predicted freely in well informed circles in Washington, AVIATION has not felt it worth while to give much attention to the score or more bills that have been introduced and allowed to die in committee.

It is an unfortunate commentary on the inertia of official Washington to have to admit that the heirarchy of the Army and Navy can calmly overlook the recommendations of the President's Aircraft Board, Congressional Committees and an overwhelming public opinion in favor of a change in the existing conditions. But, with true sagacity, the whole agitation is capitalized to get additional funds.

No one will begrudge the services of a penny of these increases. They may, however, have one ill effect. The public may come to believe that the increases in equipment represent more than a material gain. In that event all the work that has been done by those interested in larger and more independent air services will have been in vain.

The Need of Impartial Flight Testing

THE STEADY growth of interest in commercial aviation, so apparent throughout the United States at the present time, with its attendant competitive selling of many types of commercial aircraft, brings to the foreground once more, the old problem of uniformity of flight tests and published performance data. It is, unfortunately true, that a great deal of performance information, as published at present, is inaccurate and non-uniform, and this condition often leads into difficulties.

A most unfortunate part of it all is that this inaccuracy and non-uniformity of information is not intentional, but rather is it the inevitable result of the haphazard methods of flight testing employed, in all good faith, by many manufacturers at the present time. The very nature of performance tests and the many factors entering into such tests, tend to produce a cumulative error unless extraordinary care and standardized methods are used. The subject of performance tests should be considered from both the mechanical and human standpoint.

On the mechanical side of the problem, there is the employment of properly selected and accurately adjusted instruments, the use of speed courses which have been carefully measured and are of sufficient length to indicate true speeds, and the proper consideration of atmospheric conditions.

On the human side, there is, first, the pilot. Flight testing is exacting in its requirements and should be done by a pilot skilled in the work,—one who knows the kind of errors that are apt to creep into the data through careless flying. If the pilot is not experienced, it is absolutely necessary that he be given minute and comprehensive instructions by someone familiar with the work. Trained observers are also needed,—men who are familiar with the tests and instruments, and the interpretation of results, and who will be quick to correct any unusual condition which might operate either to the advantage or disadvantage of the machine being tested.

From a consideration of the above, it appears that it would be of great advantage to have flight tests standardized and conducted by some organization whose competency is generally accepted and recognized. The question then becomes: "Where is there such an organization?"

The information necessary for conducting flight tests could be obtained from the Army and Navy air services who have devoted a great deal of time to study along these lines. Aircraft manufacturers then could cooperate and devise a standard type of test for commercial airplanes, acceptable to all.

There would be nothing arbitrary or compulsory in the operation of the plan. A manufacturer who developed a new type of commercial airplane, for instance, would first make his own tests and experiments, and continue them until he was satisfied that the airplane was in its final form and ready to offer to the public.

The benefits of such a plan seem obvious. The public would soon place full confidence in these published performance figures, which would thus become valuable sales arguments. The manufacturer, who had concentrated his efforts on performance, would reap his reward, and not suffer the disappointment of seeing an inferior machine surpass his in "paper" performance through inaccurate flight testing. And the manufacturer who had not concentrated on performance would realize that neither he nor the public were under any illusions on that score, and he would be free to direct his sales arguments along some other line, such as cost, maintenance, etc.

Perhaps the greatest benefit of all would be that which would accrue to all concerned in aviation, in that there would be built up gradually a general understanding of the capabilities of airplanes, a realization of what to expect and perhaps more important, what not to expect from them. Commercial aviation would then be free from one of its worst milestones—that of having steady, regular progress made to appear small and puny in the light of wild and exaggerated dreams.

Modern American Aircraft Engine Development

By CHARLES L. LAWRANCE
Before the Royal Aeronautical Society, London, England

IN PRESENTING a paper on the subject of Modern American Aircraft Engine Development, I propose to call your attention to some of the interesting and unusual features of our American engines, and briefly run over some of the engineering considerations which have led to the designs in question. For your convenience in following me, I am, first of all, giving you a table of engine data covering all engines now in general use, or shortly to be in production, in the United States. In this table you will note the last column on the right is devoted to "Power Plant Weight per Horse-Power Hour." This term requires definition. As a manufacturer of, and a strong believer in, air-cooled aircraft engines, I would not be giving a fair comparison between the various types listed unless I took into consideration the weight of the water, piping and radiator necessary to complete the water-cooled power plant. I have assumed 0.6 pounds per rated horse-power for cooling systems for water-cooled engines, which is probably about the average. The term "Power Plant Weight" then, is the weight of the bare engine for air-cooled engines, and the weight of the bare engine plus 0.6 pounds per horse-power for water-cooled engines.

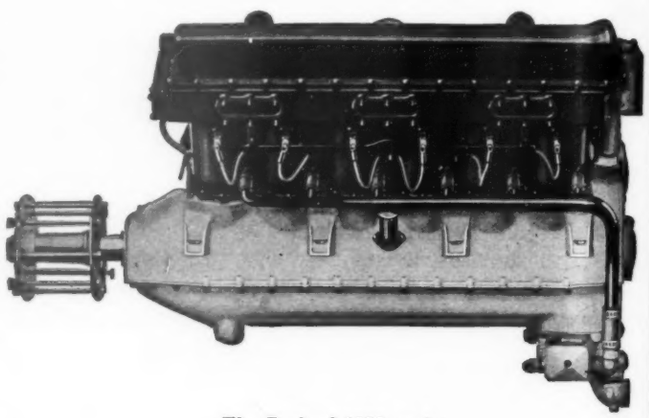
Chief Water-Cooled Types

Turning first to the water-cooled engines, we find six engines, the two Packard engines, of 1,500 cu. in. and 2,500 cu. in., respectively; the Wright-Tornado, of 1,947 cu. in.; the Liberty; the Curtiss D12 and the Curtiss V-1400. These engines range from 420 hp. to 800 hp.; the Liberty being rated at 420 hp., the Curtiss D12 at 430 hp., the Curtiss V-1400 at 500 hp., the smaller Packard at 510 hp., the Wright-Tornado at 600 hp., and the larger Packard at 800 hp. It will be noticed that, with the exception of the Liberty, these are all 12-cylinder, 60-degree V type engines, and that the new Curtiss V-1400 and the two Packard engines are the lightest, these three being the latest water-cooled engine developments in the United States. They are all noteworthy for their compact form and small over-all dimensions, the details of which I shall touch upon later.

The most interesting feature of the majority of these engines is the cylinder construction, particularly that of the two Packard engines, which have been designed by Mr. L. M. Woolson. In some ways these are a great departure from current practice. You will note the steel cylinder and steel head, which is made with four annular protuberances surrounding the four valve seats. To these is welded a steel plate on which the valve ports and operating mechanism are bolted. You will notice in this construction that the valve seats are very rigid, due to the circular ribs forming gas passages; and that the gasket between the valve port and cam housing has only the functions of an inlet, exhaust and water gasket and does not have to resist any high pressures. The cylinders are individual, with a very small space, allowing a very close cylinder spacing.

Valve Arrangements

The most interesting feature of the design, however, is the arrangement of the ports when viewed from above. It will be noticed that the exhaust port is common for two cylinders, as is the case with the inlet ports for cylinders 2—3 and 4—5. This unorthodox arrangement makes possible a very close coupled engine, the distance from the interior of one cylinder



The Packard 1500 engine

bore to the interior of the next being only 5/8 of an inch. This construction would seem to be open to severe criticism on account of the blast from the exhaust valves located in the deepest part of the pockets passing around the stems and guides of the valves near the port openings. That this design shows serious cooling problems is shown by the ingenious system of oil cooling of the exhaust valves that has been adopted by the Packard Company. Oil is fed from the camshaft bearings into the camshaft, and thence into the base of the cam follower guides through the tappets into the ends of the exhaust valves. In the valves is inserted a tube which carries the oil to the valve head, whence it flows back up the outside of the tube to holes in the stem above the valve guide. This system has worked out exceedingly well, and quite a number of engines of this design are operating very

Rated Horse-power.	Name.	Type.	Cooling.	No. of Cylinders.	Bore and Stroke. Inches.	Displacement. Cu. Inches.	Speed. R.P.M.	Compression Ratio.	Brake Mean Effective Pressure.	Bare Engine Weight. Pounds.	Power Plant Weight per H.P. in Pounds.
430	Curtiss D-12	60-degree V Type	Water	12	4.500 x 6.000	1,125	2,250	5.3	132	690	2.20
500	Curtiss V-1400	60-degree V Type	Water	12	4.875 x 6.250	1,400	2,100	5.6	134	660	1.92
420	Standard Liberty	45-degree V Type	Water	12	5.000 x 7.000	1,650	1,700	5.40	118	880	2.69
510	Packard 1A-1500	60-degree V Type	Water	12	5.375 x 5.500	1,497	2,100	5.50	128	735	2.04
600	Wright T-3 A	60-degree V Type	Water	12	5.750 x 6.250	1,947	2,000	5.40	122	1,150	2.51
800	Packard 2500	60-degree V Type	Water	12	6.375 x 6.500	2,489	2,000	5.70	127	1,150	2.04
200	Wright J-4 A	Fixed Radial	Air	9	4.500 x 5.500	786	1,800	5.00	112	470	2.35
350	Wright R-1200	Fixed Radial	Air	9	5.50 x 5.50	1,176	1,900	5.0	124	640	1.83
400	Curtiss R-1454	Fixed Radial	Air	9	5.625 x 6.500	1,454	1,700	5.4	128	790	1.975
420	Air-Cooled Liberty	Inverted 45-degree V Type	Air	12	4.625 x 7.000	1,412	1,800	5.4	132	950	2.26
425	Wright P-2	Fixed Radial	Air	9	6.000 x 6.500	1,654	1,700	5.0	120	820	1.93
30	Wright-Morehouse	2 Cyl. opposed	Air	2	3.750 x 3.620	80	2,500	5.00	119	88	2.93

satisfactorily with a very low weight power ratio, 1.44 pounds per brake horse-power for the bare engine, in both models.

Just before sailing I heard that a Packard 1500 engine had just completed a 50-hour full power test, developing 605 hp. during the entire test, at 2,500 r.p.m.

Cylinder Construction

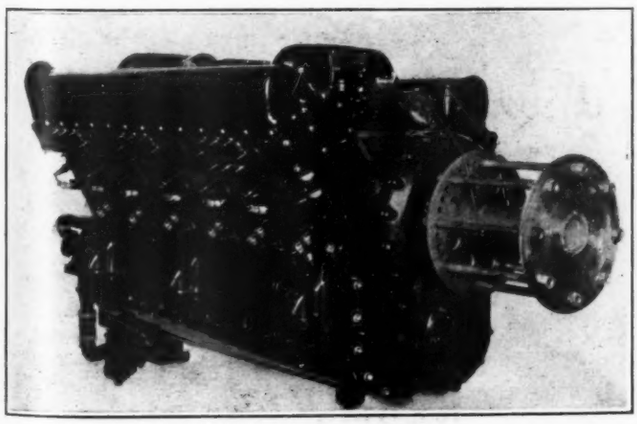
That this type of cylinder construction is not essential to very light weight is demonstrated by the Curtiss V-1400, which is the lightest of all our engines, and which was designed by Arthur Nutt. This engine employs a type of cylinder construction which, while originating in England, does not seem to have been sufficiently appreciated in Europe, namely, the steel sleeve threaded into the aluminum head. This construction does not permit as close cylinder coupling as is the case in the Packard design, but it is more orthodox, and I believe less liable to trouble from gas or water leakage, or from valve trouble. It is interesting to note that the Curtiss V-1400, which has an official rating of 500 hp., with a brake mean effective pressure of 134, weighs only 660 lbs., or 1.32 lbs. per hp. for the bare engine, and with high compression and special fuel, as run in the Pulitzer and Schneider Cup Races, it developed 620 hp. at a weight power ratio of only 1.06 lbs. per hp.

A somewhat similar cylinder construction is used in the Wright-Tornado engine. In this cylinder the head is roof shaped and the cylinder barrel does not come in direct contact with the water. This has been altered in a later design with no increase in performance, but, as can readily be imagined, with a very great decrease in weight.

The roof type of cylinder construction involves the use of interesting tool equipment. The cylinder block is placed upon the table of a heavy duty upright drill, and the machine units, consisting of a barrell, at the base of which are two movable cutters, is fed down into the cylinder. The movable cutters are operated by a cam mechanism, which imparts to them a motion corresponding to the form that it is desired to reproduce. A cylinder head is finished in about thirty minutes.

Very Satisfactory Valve Gear

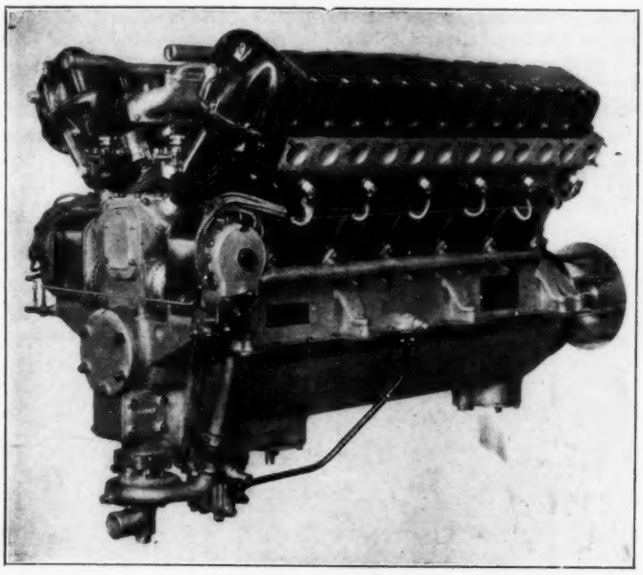
To accommodate four valves with a single camshaft, operated by means of rockers, it was believed that a more rigid head could be produced of the roof shape than was the case with the flat head employed in other American engines. For the maximum speeds at which this engine operates, around 2,200 r.p.m., at which speed it develops over 700 hp., the rocker valve gear seems perfectly satisfactory and is more



The Packard 2500 engine

compact than any of the other gears, except the Packard, which has a very convenient arrangement of the valves for operation purposes.

It will readily be understood that, with such close cylinder spacing, all these engines run to very high unit bearing loads, and it is only through the general rigidity of construction of the crankcases, bearing caps and crankshafts that such loads are possible. The crankcases are heavily ribbed, in some cases with a double rib for each bearing. The bearing caps are dural forgings of the most massive construction and the crankshafts are of very large diameter.



The Curtiss D-12 engine

An idea of the relation between cylinder volume and section modulus is given in the appended table.

CRANKSHAFT DATA.
Main Bearing.

Make and Model of Engine.	*Piston Displacement per Cylinder. Cu. Inches.*	*O.D.*	*I.D.*	*Polar Section. Modulus. Zp. in 3.*	*Zp. / Piston Displ.*	*Overall Length of Crankshaft. L.*	*L x Piston Displ.*
Liberty	137.5	2.625	1.375	3.28 in.³	.0238	57¾	.000412
Packard 1500	124.8	3.000	2.250	3.62	.0290	53 7/32	.000545
Curtiss D-12	95.4	3.000	2.250	3.62	.0380	49 29/32	.000761
Curtiss V-1400	116.7	3.000	2.250	3.62	.0311	51 23/64	.000605
Wright-Tornado	162.3	3.250	1.667	6.25	.0385	59.609	.000646
Packard 2500	207.5	3.500	2.469	6.32	.0305	60.00	.000462

It will be noted how much progress in rigidity has been made since the Liberty was designed, the ratio of volume to section modulus being about 25 per cent less than the average of the other engines.

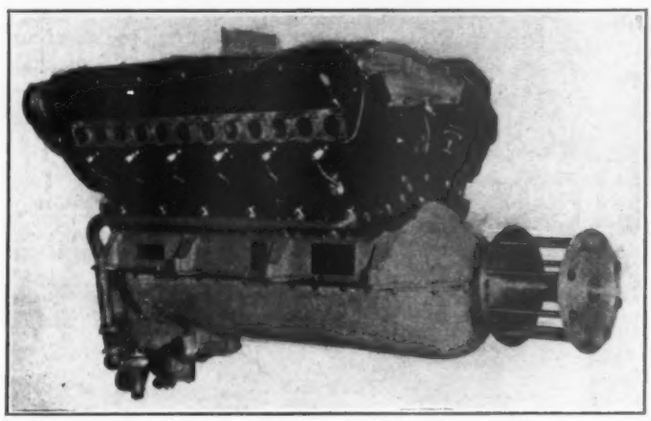
High Bearing Loads

The bearings in all the engines, except the Liberty, are steel backed, and babbitted with a metal having approximately 91 per cent tin, 4.5 per cent antimony and 4.5 per cent copper. The loads carried are high and the rubbing factor in many cases becomes out of all proportion to what we have learned to believe was correct. The following table shows this clearly. In this table *PV* is the product of mean unit load by the rubbing velocity in feet per second.

		Crankpin.			*Centre Bearing.*			*Intermediate.*		
	Revs. per min.	*Maximum Unit Load.*	*Mean Unit Load.*	*P V.*	*Maximum Unit Load.*	*Mean Unit Load.*	*P V.*	*Maximum Unit Load.*	*Mean Unit Load.*	*P V.*
Curtiss D-12	2400	1230	948	24800	1190	936	29400	1053	651	20500
Curtiss V-1400										
Packard 1500	2100	1191	808	18520	1692	1274	35000	1685	983	27000
Liberty	1700	1035	750	13200	1580	1365	22650	1150	720	1400
Wright-Tornado	2000	1705	900	23600	781	552	15700	1675	861	24450
Packard 2500										

It will be noted that the rubbing factor for the center bearing of the Liberty is 22650. Formerly this was considered

high, and is in fact the maximum to which this bearing can safely be subjected. On the other hand, we note rubbing factors as high as 35000 for some of the other engines, with no apparent reason why the factor should not be still further increased. It would seem that we are far from reaching the limit in rubbing factor for oil lubricated bearings. So long as the bearing can be kept cool by a proper application of oil, or otherwise, and the parts made sufficiently rigid, it is hard to predict how far we can go in regard to bearing loads and rubbing factors. Wherever distortion takes place, localized high bearing pressures occur, in some cases stressing the bearing material beyond the elastic limit, and in any case fatiguing the metal by the repeated deflections over a period of time. Given sufficient rigidity, the practical limit, therefore, becomes the amount of oil that can be circulated without running into oil consumption troubles. Actually the engines in question are running with oil pressures of from 100 to 160 lbs. and with oil consumptions of less than 0.03 lbs. per hp.



The Curtiss V-1400 engine

Articulated and forked type rods are both successfully used, but until the steel backed type of bearing, as used in the Rolls-Royce, was adopted, the advantage was all on the side of the articulated type. Without the steel backed bearings it was impossible, in large engines employing the forked construction, to get the proper big end rigidity. A few ounces saved in this part of the engine is of no consequence as compared with the gain in bearing life, and whichever type of rod construction is adopted, any weight in the big end which is properly located so as to give added rigidity to the bearing, is more than repaid in added revolutions per minute possible and in greatly increased endurance. In this connection, a process has been developed by the Allison Engineering Company of Indianapolis, whereby a bronze covering is cast upon the portion of the steel shell, which acts as a bearing for the blade rod. It adheres perfectly and can be made of any good bearing material. A high lead bronze seems the most satisfactory material for this purpose.

Piston Rod Construction

With the articulated type of rod, it is certain that the pistons attached to articulated rods are subjected to greater lateral unit pressures than those attached to the master rods. As we have found from our air-cooled engine development, where piston conditions are more severe and which I shall touch upon later, there is a definite limit to the unit lateral pressure which can be applied to a piston before excessive wear or scoring ensues, and therefore it seems reasonable to assume that if the articulated rod pistons run satisfactorily, then by using the forked construction the rod stroke ratio could be somewhat reduced and the engine correspondingly lightened. However, general practice in the United States seems to lean toward the articulated rod construction, all the engines mentioned, with the exception of the Wright-Tornado and the Liberty, having this style of rods.

The design of pistons in the United States seems to be somewhat stabilized, all manufacturers using some form of ribbed pistons and all, with the exception of Curtiss, using the type where the ribs are parallel and perpendicular to the piston pin axis. This type of piston will be recognized as almost the same as the original Hispano piston, developed in 1914, with the addition of a very heavy fillet on the rib over the piston pin bosses. Without heavy fillets at this point the piston is unsatisfactory, as the piston pin bosses tend to split, on account of deflection of the boss on each side of the supporting ribs.

Attention to Piston Cooling

This type of piston was given up for a long time on account of the influence of the Liberty type of piston, which was being produced in large quantities during the War. Being almost entirely without ribs, this type was very easy to cast in a metal mold, and was at that time considered the best type for the dissipation of heat down the sides of the piston and into the cylinder walls. It was unduly heavy, however, and its design did not take into account the possibilities of heat dissipation from the inside of the head to the oil which was thrown against the piston. We now believe that this method of piston cooling is just as important as the transmission of heat down the sides of the piston and into the cylinder walls, and experiments recently made with a single piston lead us to believe that the dissipation of heat through the piston rings, where the heat has to travel through two oil films, has been greately overrated.

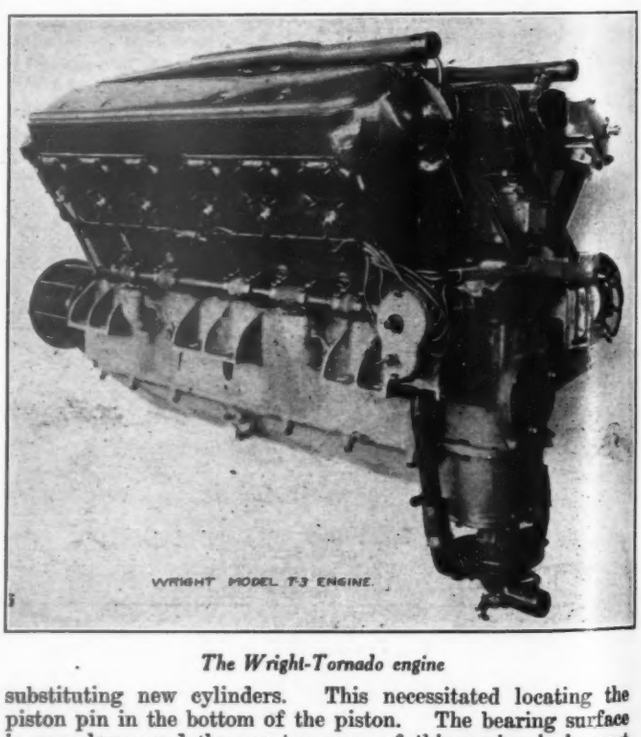
The Curtiss type of piston is different, having radiating ribs and a circular rib in the center and, although the design seems to me less logical than the type described above, the results are eminently satisfactory.

An extreme type of piston, which has proved very satisfactory for use in water-cooled engines, is the Packard piston. This is of the slipper type with a heavy and essentially ribless crown. Some idea of the extreme dimensions of this piston may be gathered from the following table:—

	Diameter.	*Total height.*	*Weight, bare.*
Packard 1500	.....5⅝ in.	3 11/32 in.	2.94 pounds
Packard 2500	.....6⅜ in.	3 15/16 in.	4.47 pounds

The length of the 1500 piston is only two inches below the rings.

Going to the opposite extreme is the piston of the air-cooled Liberty engine, in which it was desired to keep the engine unchanged and retain the old camshaft centers, merely

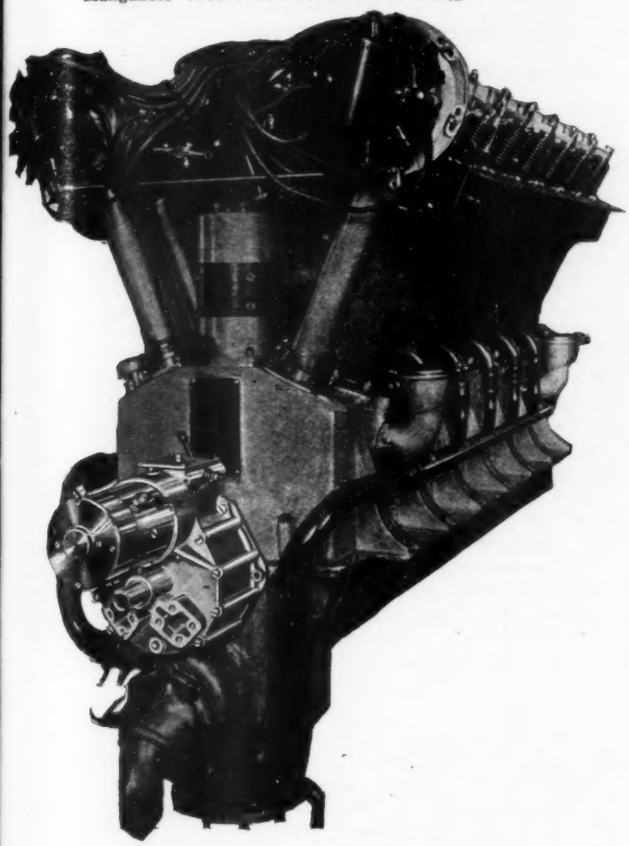


The Wright-Tornado engine

substituting new cylinders. This necessitated locating the piston pin in the bottom of the piston. The bearing surface is very large and the great success of this engine is in part due to this unusual piston, which runs cooler and remains in better condition than any aircraft piston I know of, whether air or water-cooled. The material most favored for pis-

tons in the United States is the "Y" alloy, developed by the National Physical Laboratory, with a composition of

Aluminum	92½ per cent.
Copper	4 "
Nickel	2 "
Manganese	1½ "



The Liberty XII engine

This material is treated at 935-965 degrees Fahrenheit for five hours, quenched in boiling water, aged one hour at 400 degrees Fahrenheit, and should have a Brinnel hardness of 100 minimum when sand cast, and somewhat higher if die cast. The tensile strength should show a minimum of 33,000 lbs. per square inch.

To be concluded.

Aircraft Exports

The Department of Commerce announces the following statistics of domestic exports in aircraft and aircraft engines from the United States during the month of December, 1925:

	Internal combustion engines for aircraft		*Airplanes, seaplanes and other aircraft*		*Parts of except engines and tires*	
Countries	*Number*	*Dollars*	*Number*	*Dollars*	*Pounds*	*Dollars*
United Kingdom	2	19,376	.	....	....	....
Canada	.	....	.	....	927	1,535
Mexico	.	....	.	....	85	300
Argentina	2	2,775	.	....	....	....
Brazil	.	....	1	14,100	....	....
Colombia	.	....	1	27,479	....	....
Java and Madura	.	....	1	11,750	....	....
Siam	10	1,200	.	....	....	....
Totals	14	23,351	3	53,329	1,012	1,835

Spain-Argentina Flight Not to Continue

Tentative plans for the extension of the flight of the Spanish transatlantic fliers, headed by Comdr. Ramon Franco, have been abandoned.

When the fliers arrived at Buenos Aires, ending their voyage from Palos, Spain, it was understood they might continue across to the West coast and thence northward, eventually reaching New York, however, they have received the following message from the Spanish Government.

"The Government is persuaded of the perfect condition of the plane for continuing the flight, but is likewise convinced of the danger to the fliers, although the details of the route have been closely studied by Commander Franco.

"In consideration of the special circumstances created by the world-wide reaction to the wonderful flight already made, the Government has decided to terminate it at the Argentine capital.

"Commander Franco is authorized to visit Montevideo on Ne Plus Ultra. The Dornier Wal seaplane has been presented by King Alfonso of Spain to the Argentina Government.

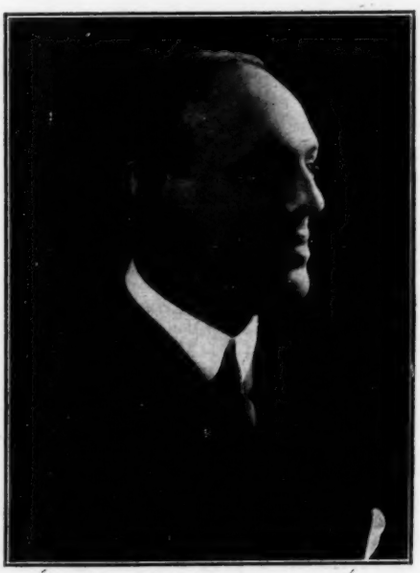
Continental to Make Aircraft Engines

The Continental Motors Corp., one of the oldest and largest exclusive manufacturers of internal combustion engines in the world, has definitely decided to enter the field of building engines for use in commercial aircraft. Ross W. Judson, president, has intimated that, after exhaustive research work, the management of his company believed that the country is just about to enter into great activity in commercial aviation and that Continental had been doing considerable experimental work with aircraft engines.

Mr. Jordon is well known for his personal interest in flying. He was one of the first purchasers of a Loening Air Yacht and has flown extensively in the South and between New York and Detroit.

In discussing his company's intention of entering this field, President Judson said "Continental's decision to enter this new field of activity is by no means a new idea, as, for the past several years, we have watched aircraft development very closely and have seen a very decided interest being shown. The public now realizes that, with the latest types of planes, they can fly in greater safety than they can motor along roads already made dangerous by traffic congestion, not to mention the additional hazard of thousands of green drivers.

"The Safety feature of commercial aviation has been recognized by aircraft authorities and this knowledge has been transmitted to the public. There are at present approximately 39 manufacturers of airplanes now operating in the country and I look to see this number greatly augmented in



R. W. Judson
Pres. Continental Motor Corp.

1926. Up to Oct. 1, there were approximately 400 airplane engines manufactured in 1925 and I estimate that 1926 will see 2500 aircraft manufactured.

"Continental stands in an enviable position from the standpoint of production. We have an efficient engine manufacturing organization with the experience of having built nearly 3,000,000 gasoline engines and, in addition to this, we own the patents on an engine that is ideally adapted to aircraft work. Our facilities are such that we can manufacture these engines on a large production scale, thereby greatly lowering the cost of manufacture."

Cutting Fuel Cost in Air Transport

Where a Correct Understanding of the Conditions and Requirements Will Lead to Economic Operation.

By CHARLES McH. POND

ANYONE, WHOSE interest has been aroused in the problem of economical air transport, through association with a similar problem, must have come, by this time, to the conclusion that we have not yet made the right combination of the factors involved. Maybe the problem is one having more than one case for solution. In any case, it is certain that, before any problems involving a simultaneous solution can be solved, all the factors have to be brought out. Maybe, having all the factors, we have not yet hit on the right eliminations.

An incident at Fort Meyer may be recalled. A reporter asked the Wright's how they accounted for the fact that their airplane could continue in flight after leaving the launching rails, although the additional power supplied by the falling weight was required to give the airplane its initial start. The Wright's replied that comparatively little power is required for flight after the airplane is in the air.

A Reply with Great Significance

This brief answer was apparently satisfactory. Little did the reporter realize that his question involved the whole intricate field of propeller performance. Nor did he realize the thorough knowledge of this subject that Langley, Manley, the Wright's, Curtiss, Maxim and other pioneers had at that time. As a matter of fact, the profitable operation of airplanes as commercial carriers, can be realized only by getting back to the basic principles covered by this reporter's question.

The original Wright engine had four horizontal cylinders and developed about 12 hp. at 1,200 r.p.m. and weighed 170 lb., which represents about 14 lb. per hp. Assuming that the Wright propellers had an efficiency of 75%, the actual output of the propellers was 9 hp. Since the Wright airplane had two propellers, each propeller developed 4½ hp. The propellers were chain driven and turned at a surprisingly low speed, this being about 600 r.p.m.

Since the airplane required all of 9 hp. to keep above the stalling speed, the propellers had to be so designed as to develop their maximum thrust at or above the stalling speed. That is to say, as the weight dropped and the airplane advanced along the rails with throttle wide open, the propeller thrust was built up as the speed of advance increased, attaining its maximum figure just at the speed at which the airplane left the rail in full flight.

Pioneers Understood Problems

In the mean time, Curtiss, Santos Dumont, the Farmans, Voison and Bleriot were working on the problem of securing sufficient propeller thrust at the lower speeds of advance to permit taking off by means of an initial run on landing wheels. How well these pioneers knew their problem. Santos Dumont was getting into the air on short hops by giving his propeller its maximum thrust below the take off speed.

About this time, the Curtiss shop at Hammondsport was leading all others in engine development. Furthermore, Curtiss had developed a propeller that gave a high initial thrust as well as sufficient thrust for flying with a good margin above the stalling speed. It should be kept in mind that this propeller required an engine of double the power of the original Wright engine.

Following their original horizontal cylinder engine, the Wrights produced a vertical four cylinder engine. This second engine developed about 35 hp. at 1,200 r.p.m. and weighed 180 lb., about 5 lb. per hp. The excess power permitted the use of wheels on the Wright airplane, in place of the falling weight and launching gear. The perfection of the now historic "Model B" airplane quickly followed. Curtiss then brought his famous "Model L" engine and won the race at Rheims, France, in 1909, only three years after Langley had gone. The "Model L" engine developed 50 hp.

Keeping in mind the fact that the early airplanes that got their initial run on landing wheels, were *no faster* in the air than the Wright machines, which took off with the aid of the falling weight, it is clear that the excess engine power required to take off with wheels was absorbed by the propeller after the take-off was accomplished. This was by reason of the propellers' inefficiency at any higher speed of advance.

Reduced Operating Costs

This leads to the conclusion that the manner of taking off, will have a lot to do with fuel economy in air transport. This being a fact, is it not logical to determine just what the most economical practice should be, and operate our transport airplanes accordingly? It is clear that both greater economy in fuel consumption and a lower engine depreciation can be realized only by reducing the engine turns per mile for any given load carried, power and revolutions per minute of course, remaining the same.

In the days of exhibition flying, the restricted areas from which airplanes were required to fly, had to be considered.

Keeping in mind the performance of the original Wright machine, it is clear that, if we eliminate the necessity for high initial thrust for getting under way, we can sacrifice the propeller efficiency at the lower speed of advance and realize a corresponding gain in propeller efficiency at a higher speed of advance. In other words, we can release a large portion of the engine power available, for propulsion at a higher speed, with the same revolutions per minute. This is the method universally employed in marine practice to get the lowest number of engine turns between terminals, for both passenger and freight liners.

Practical Application to Air Transport

Let us see how this arrangement will work out in the air transport. By providing large terminal landing fields, the angle of climb can be reduced. The elimination of this factor permits:

1. A corresponding increase in the take-off speed without increasing the rate of climb.
2. Lower rate of climb necessary to clear the field.

Altogether, this arrangement would permit of a very much higher speed, with the engine power available.

An airplane operating from large terminal fields on a run of sufficient length to be profitable—say 500 miles or more—will actually furnish a faster service between cities, by reason of the higher speed in flight which the large terminal fields will permit. The multi-engine airplane propelled by high speed, small diameter propellers, will unquestionably solve the problem of economical operation in air transport. The regular ports of call should be the only landing fields required, with the possible exception of large regularly used fueling stations that would be an economic advantage on some very long runs.

Equipment for the Chicago-St. Paul Air Mail

Four Laird airplanes, powered with Wright Whirlwind 200 hp. air-cooled engines, will be used by Charles Dickinson, of Chicago, on the air mail route between Chicago and St. Paul-Minneapolis, via Milwaukee and La Crosse, Wis. Mr. Dickinson recently received the award for this route upon a bid of 48 per cent of the revenue derived from carrying the mail.

It is interesting to note that this air mail route will have to operate in a particularly rigorous winter climate, being rivalled in this respect only by the route from Elko, Nev., to Pasco, Wash. Such conditions led to the selection of Wright air-cooled engines.

Professional Pilots Association

An Organization for the Protection of Pilots and the Encouragement of Reliable Air Transportation.

By WALDO D. WATERMAN

President, Professional Pilots Association

WE, ON the Pacific Coast, have realized the need of an organization of the pilots themselves to protect their interests and to encourage the normal advance of aviation as a safe and reliable means of transportation.

To supply this need, two and a half years ago, a group of practically all the old time pilots flying commercially, formed an organization known as the "Professional Pilots Association". Briefly, the purposes of the organization are: To encourage the use of the airplane in all phases which will promote its commercial development; to encourage the establishment of landing fields; to assist in the passing of constructive legislation and fight the passage of destructive legislation on aircraft matters; to certify as airworthy any ships presented to the association's engineering board which merit such certificate and to discourage the use of unairworthy equipment; to discourage needlessly low and other forms of reckless flying; to discourage unqualified pilots from carrying passengers; to encourage the design and manufacture of commercial aircraft; to encourage constructive and discourage destructive publicity and to investigate crashes and furnish the press with the real cause of accidents investigated.

The Officers

The Professional Pilots Association is a non-profit organization. Officers for the fiscal year are: W. D. Waterman, president, K. W. Montee and F. C. Whitney, vice presidents and Boyd Monteith Shelton, sec.-treas. Our dues are nominal, being but $1.50 a year with an initiation fee of $5.00. None of the officers, including the secretary, receive any compensation. Further, no permanent quarters are maintained, meetings usually being held at some cafe where we meet for dinner. If the organization becomes national, as we hope that it will, naturally permanent quarters and a paid secretary devoting all of his time will have to be arranged for.

Meetings

Since its organization, the Professional Pilots Association has met once a month. About three times a year, open meetings are held to which all those having a vital interest in aviation are invited. As an example, one of these meetings was held last Tuesday night. A debate was held, the subject of which was, "Resolved: that stunt flying, except for military, instruction and test purposes, is a detriment to the advance of commercial aviation". Each side had three speakers, who had been preparing on the subject for three months previously. In order to get an unbiased decision, three judges of the Superior Court acted as judges for the debate. Incidentally the affirmative won.

Approximately two hundred men were present. As it is our custom to ask each guest to introduce himself at such gatherings, stating his aircraft affiliations, it was revealed that 95% of those present were either air pilots, ground employees of aircraft companies or flight students from the various flying fields. Cy Caldwell would have revelled in the absence of his cherished Modocks. I doubt if there is any other district in the country where such a turn-out could have been obtained, as we undoubtedly have more flying per capita here than in any other section in the United States.

The Professional Pilots Association was not organized with the idea of its being purely a local organization. Our growth, to be sure, has not been rapid, but we now feel that the time is ripe for us to become a national organization, or at least a part of a national organization. We feel that we have done the pioneer work of banding together a group of men gaining their livelihood as air pilots. We appreciate the feeling that many Easterners may have, that such an organization should have its home offices in the east or middle west. We are not obstinate on that point and if such a change seemed advisable, would gladly concur with it.

Membership Requirements

Our membership requirements are briefly this: Members must have flown four years or more; members must be actively engaged in commercial flying, deriving at least a portion of their livelihood therefrom; they are prohibited from stunting with passengers for pay; they are prohibited from reckless flying or flying at needlessly low altitudes; they are prohibited from flying unairworthy ships; they must be tempermentally fit to be air pilots, in the minds of the membership committee. Favorable recommendations of the membership committee must have a majority vote of approval at a regular meeting of the association.

We appreciate the fact that the four year clause keeps out many excellent pilots; but, in order to keep the standard high, we have considered this a necessary feature. If, through your co-operation, we expand into the national organization that at present is much needed by the industry, we suggest that a junior organization be formed for the pilots that have not flown four years or more and for the pleasure pilots.

Although at present our membership is small, through our open meetings, and the fact that our members are connected with all Western aeronautical development, our influence is large. By far the largest proportion of the West Coast pilots, who can qualify as members, have joined the organization and are living up to the high standards which it sets. In our last fiscal year, August, 1924-August, 1925, no member of the association experienced even a minor crash. Such a record on the part of all aviators would remove the necessity of all legislation.

I am endeavoring to arrange another meeting of the Professional Pilots Association for March 9, at which the present proposed aircraft legislation will be discussed. We will be glad to send you a report on the results of this meeting, which will be the opinion voiced by approximately two hundred men to whom the future of the industry is paramount.

The National Balloon Race

The 1926 National Balloon Race for the Litchfield Trophy will be held at Little Rock, Ark., on April 29, under the auspices of the Little Rock Air Meet Association. Three thousand dollars in cash prizes is now on deposit as a special prize fund. The race will be for 35,000 cu. ft. balloons and hydrogen will be supplied, gratis, by the Little Rock Air Meet Association.

Regulations are now being prepared and will be published at an early date. The entry list is limited to 8 balloons. Entries will be accepted in the order of their receipt. The winner of 1, 2 and 3 prizes, provided they have 80,000 cu. ft. balloons at their disposal, will be designated as the American team for the International Gordon-Bennett Race which will be held in Belgium on May 30.

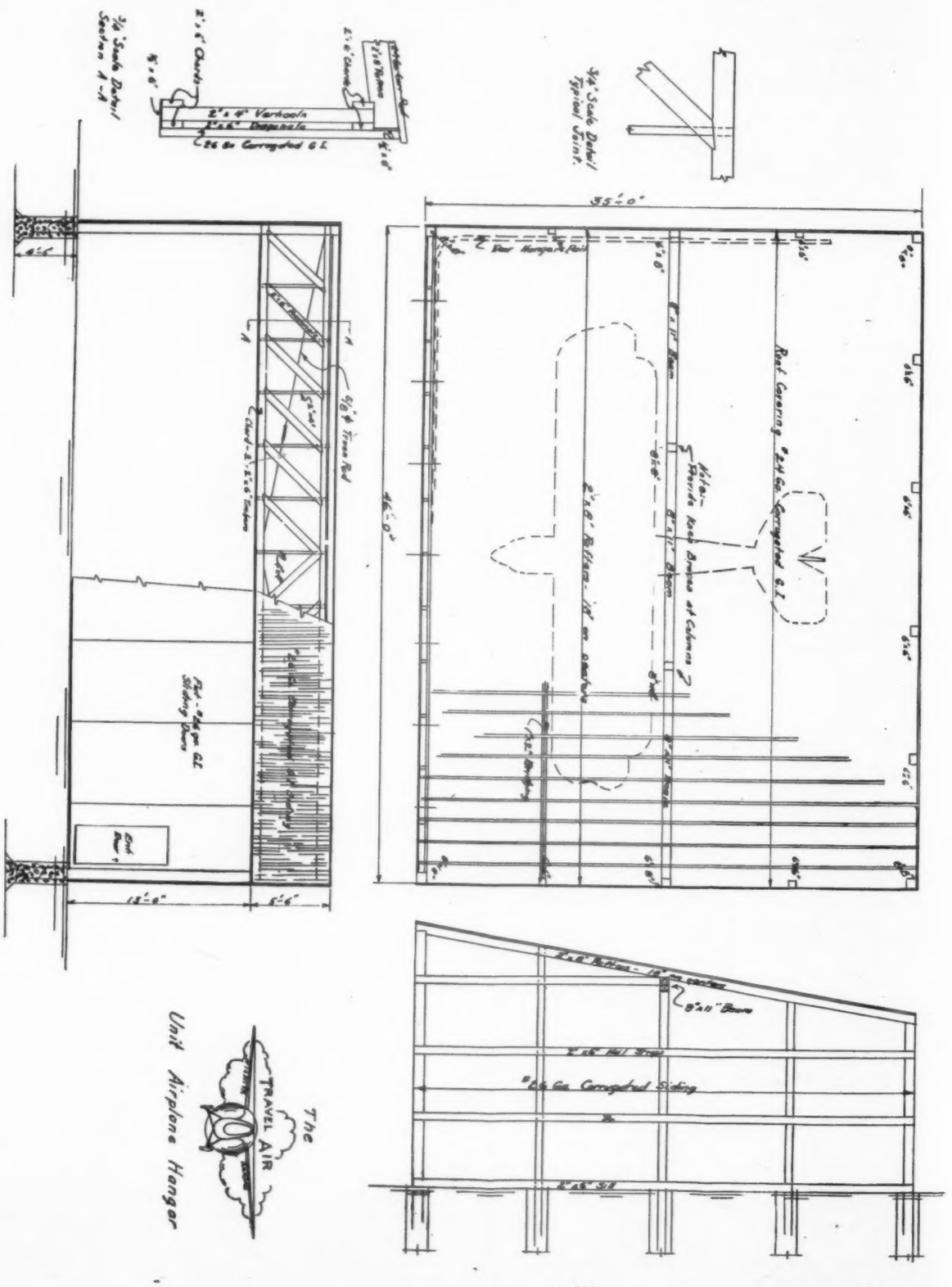
Arrangements are being made to broadcast weather reports to the contestants in the national race. Each balloon will be required to carry a pilot and one passenger. The race will be for distance measured on the arc of a great circle.

This preliminary notice will enable prospective entrants to prepare their equipment. Entries close March 20, 1926.

An Inexpensive Serviceable Hangar

THE BUILDING of a large hangar is a problem and study in itself, and has already become an industry in the hands of specialized and skillful builders and engineers, yet, to all operators who cannot afford a first class building, or to the man who wants space for only one or two airplanes, the question of a comparatively inexpensive and yet serviceable hangar is a very important one.

Realizing this and desiring cheap and practical hangar space for itself and some of its local customers, the engineering staff of the Travel Air Mfg. Co. set out to evolve a small cheap hangar. Such a hangar, it was realized, must be easy to construct, easy to manipulate, durable, roomy, well lighted, etc. The solution hit upon, as shown in the accompanying drawing, is a simple building of corrugated



galvanized iron, rough dressed lumber and garage hardware. It has been built in Kansas for less than $600.00 and estimates in New England do not run over that figure. The cost of such elemental material, and the hatchet and saw required do not vary much in any part of the country. This does not include any floor, nor any lining, beside the steel itself, which would be necessary if the hangar were to be heated for cold weather flying. A rough floated concrete floor could be constructed at a cost of about 25 cents per sq. ft. And there are several satisfactory materials for sealing upon the market, such as Celotex.

The construction is very elementary as can be seen. The end panels of the doors hinge back along the side walls and the rest of the panels are hung on a track of the type built and put on the market by a number of manufacturers of garage hardware.

There is almost one third of the hangar left available for work-benches, storage and equipment. Windows can be placed in the rear and side as each man's requirements dictate. That is, a hangar in which much work is to be done would require more light than one which would be used for storage purposes only. The ones built in Wichita have two or three windows each. The posts are shown in the drawing, set in concrete, but would be just as good set upon a block of concrete with cinder or earth around it. If no floor is put in, the ground under the doors should be made absolutely level and the clearance reduced to a minimum, as dirt will blow in and up from the floor. Just a concrete curb of simple design has been suggested.

In use, these hangars have proved very practical. One owner makes a practice of driving to the field in his car, wheeling out his ship, locking in his car and flying on business trips throughout the oil fields of Kansas and Oklahoma. The buildings have withstood a sixty mile Kansas "twister" and have proved weather-tight and proof. A small coal stove or oil burner has been found sufficient to enable work to be done during quite cold weather, and the general type of building has proved satisfactory, being designed in accordance with the severe Boston building code, in regard to structural strength.

The accompanying drawing is quite self-explanatory and should furnish all the information required for the construction of a hangar of this type.

Airplane Engine Wrecked 12,000 Ft. in Air

Two airmen, testing new engine equipment, recently had a miraculous escape when their engine was torn to pieces 12,000 ft. in the air. A new type of propeller, which was being tried out, suddenly burst. One piece of the propeller blade flew clear, while the other, still attached to the engine, whipped around with terrific force, breaking the crankshaft just

The airplane after the accident

back of the front two cylinders. The propeller and hub, front of the crankcase, crankshaft, two connecting rods and pistons were torn loose and fell clear of the airplane. Flying fragments from the engine ripped open the front of the fuselage, and tore the wing covering in many places. The airmen succeeded in regaining control of the machine and made a safe landing, while the front part of the engine fell in a farmer's yard over ten miles away.

New Ford Airplane Plant

A new airplane manufacturing plant and a new hangar having a capacity of housing fifteen or more airplanes, forming one of the largest and most modern aircraft developments in the country, will be erected within the next few months at the Ford Airport at Dearborn, Mich. Plans were being completed for this plant, which is to replace the building of the Stout all-metal airplane division of the Ford Motor Co., recently destroyed by fire. The new airplane plant, which is to occupy part of the site of the former building, will be three times as large and will have a floor area of 60,000 sq. ft. It will be fitted with every modern facility for the manufacture of airplanes laid out in the standard Ford system of progressive production. Materials will enter one end of the building and proceed through the various stages of manufacture, emerging from the other end as completed airplanes.

Until the new structure is ready for occupancy the Stout division of the company will continue to be housed in one of the new buildings in the Dearborn laboratory group where machinery already has been installed and work of building all-metal airplanes has started. Plans for the new plant call for a building 120 ft. wide by 500 ft. long and one story in height, of the same general construction as all the newer manufacturing and assembly plants of the company. An unusual feature of the building will be that it will have a full 120 ft. span from one side to the other without intervening roof supports, giving clear space for assembly of the airplanes. The roof will be of steel and glass and the exterior walls of brick, conforming in general design with the other buildings in the group at Dearborn. A heating plant will be erected in connection with the building.

The new hangar building, to be located adjacent to the manufacturing plant and on which work is already under way, will also be of brick but of different construction in order to accommodate the housing and easy handling of airplanes. It will be 123 ft. wide by 300 ft. long. An unusual feature is that each of the 300 ft. sides will be enclosed by steel and glass doors of special construction. This will permit the entire opening of either or both sides, the doors sliding back and folding into ends of the building. This has been accomplished by affecting a roof construction of cantilever type, extending on either side from steel towers built down the center of the building, the roof being supported much the same as the cloth on the steel stays of an umbrella.

An addition also is planned for the present airport hangar which will house a dynamometer room for testing airplane engines as well as other test rooms. With the completion of the new hangar building, the present hangar, with its addition, will become a maintenance and repair station for airplanes operating in the Ford Air Transport.

Pacific Coast Airways Marked

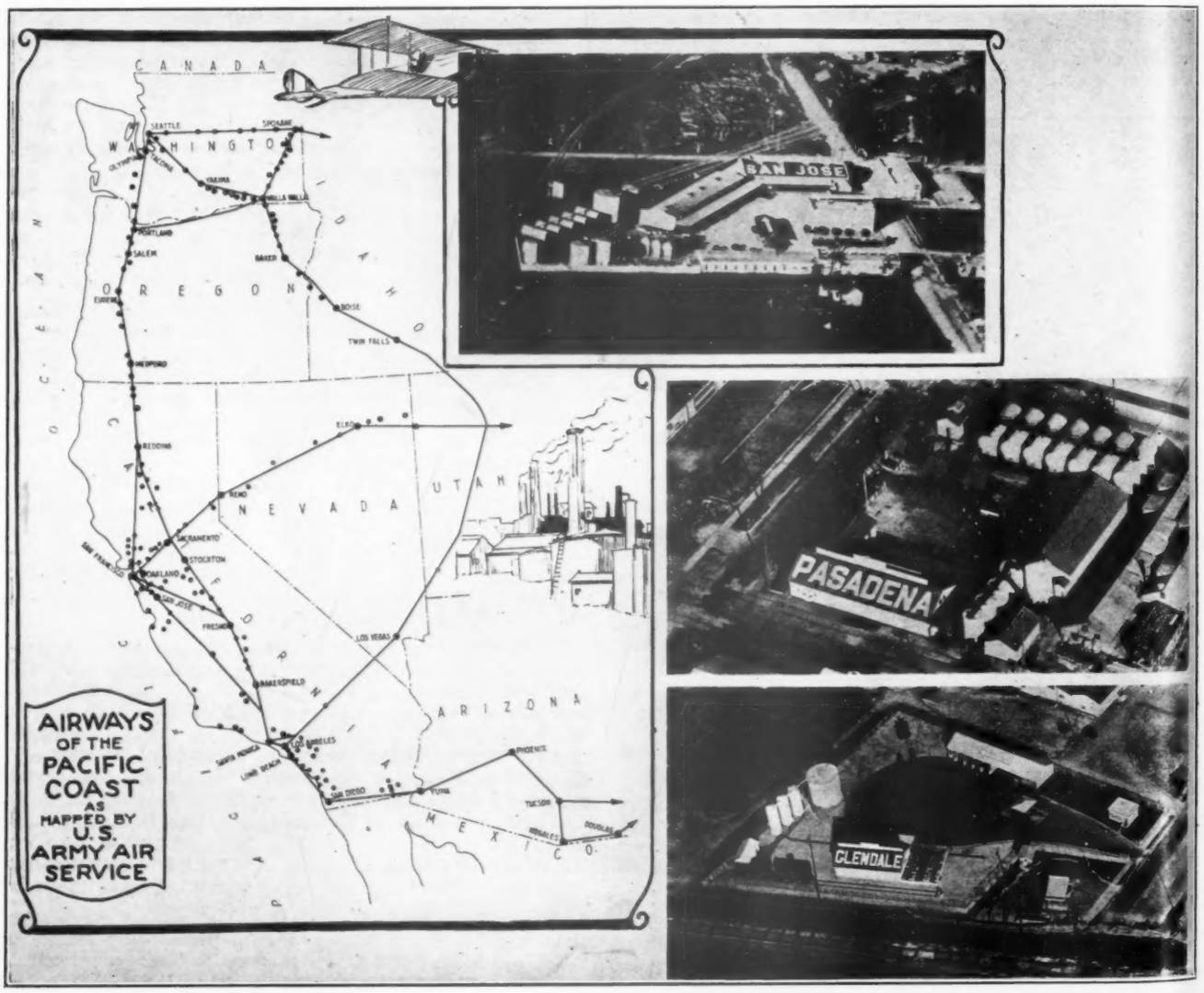
Names of Towns Painted in Large White Letters as Indicators to Assist Cross Country Fliers.

RAPID PROGRESS is being made in carrying out the Standard Oil Company's plan to mark the airways of the Pacific Coast. Some weeks ago the Army Air Service asked the company's co-operation in this matter, and the company immediately acquiesced.

The Army Air Service has mapped out certain airways on the Pacific Coast. Along these lanes the Standard Oil Company has numerous distributing plants—not service stations, but bulk storage stations—each with a warehouse or garage with a roof suitable for carrying the name of a town in large white letters on a dark background.

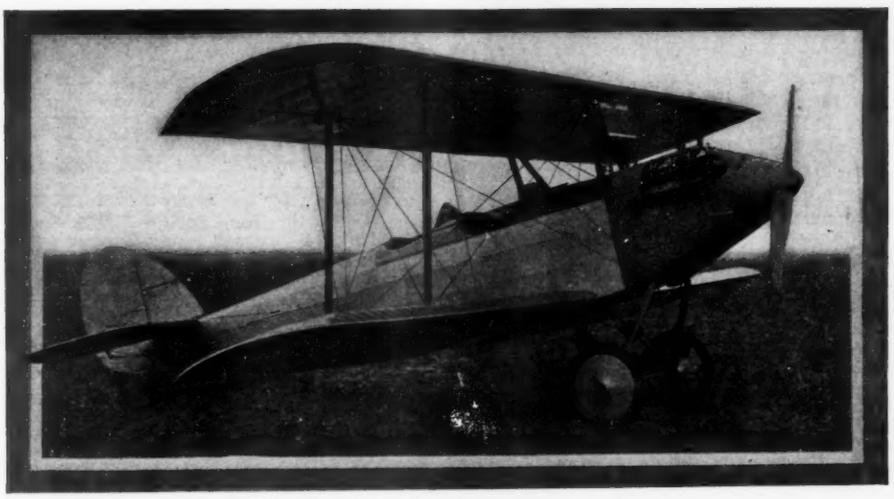
It was decided that the first airways to be marked should be those running North and South from Seattle to San Diego. More than a hundred towns were selected for the signs and the work of painting is now going on. These block letters are a minimum of 12 ft. in height, and, in many cases, much larger. In good weather the signs are all readable from 3000 ft. up, and some of them from much greater heights. Shortly, the work will be finished, and then the marking of airways eastward from Seattle, Portland, San Francisco, Los Angeles and San Diego, will be begun. All the airways will be flown over and, wherever the fliers find need for additional signs, these will be put in place. As aviation develops there will be still more air signs, until it is likely that, in the future, all of the Standard Oil Company's 650 stations will be marked.

Another thing the company is doing as an aid to aerial navigation is to place, at each station, a white arrow indicating true North when compasses are unreliable, this indication of direction will be of much benefit under certain circumstances.



How the Pacific Coast airways are being marked. *In the aerial view at the top is visible, in addition to the marker, one of the white arrows indicating true North.*

WACO



REAL PERFORMANCE IN A THREE-PLACE SHIP WITH STOCK OX5 MOTOR

The Waco does not need a larger hangar. Any field is an Airdrome.

WACO DISTRIBUTORS

NEW JERSEY and DELAWARE The Ludington Exhibition Company Atlantic Building, Philadelphia, Pa.	MISSOURI Waco Sales Company Richard's Flying Field, Kansas City, Mo.
PENNSYLVANIA and MARYLAND Roisner Aero Service Hagerstown, Md.	ILLINOIS The Mid-West Airways Corporation Monmouth, Ill.
NORTH CAROLINA Lloyd O. Yost Box 203, Pinehurst, N. C.	INDIANA Muncie Aerial Company Muncie, Ind.
GEORGIA Douglas H. Davis Griffin, Ga.	MICHIGAN The Aircraft Distributors 2320 N. Saginaw St., Flint, Mich.
FLORIDA Otis A. Hardin Sebring, Fla.	OHIO and KENTUCKY Embry-Riddle Company Lunken Airport, Cincinnati, Ohio.
LOUISIANA The Southern Dusting Co., Inc. Box 216, Tallulah, La.	NEW ENGLAND New England Aircraft Co. 805 Main St., Hartford, Conn.
OKLAHOMA The Aircraft Sales Company of Oklahoma P. O. Box 1525, Tulsa, Okla.	WISCONSIN The Roy Larson Aircraft Co. Larson, Wisconsin.

ADVANCE AIRCRAFT CO.
Troy, Ohio

Foreign Markets for American Aircraft

Statistics During Past Year Show Progress. Tremendous Field for Foreign Trade Still Apparent.

THE EXPORTATION of American aircraft products, as shown in the following statistical study, although comprising only a small percentage of automotive exports, should be of decided interest to persons fostering aeronautical industrial development in the United States. As an example of the interest already demonstrated, the aircraft industry, through the Aeronautical Chamber of Commerce of America, recently supplied the Automotive Division with copies of the "Aircraft Yearbook" for the foreign offices of the Bureau of Foreign and Domestic Commerce of the Department of Commerce. These yearbooks, as well as other information on American aircraft products, are now available for the perusal of people in the Far East, Oceania, Latin America, Africa and Europe. An increasing number of aircraft and aircraft equipment sales are expected to result.

1925 Shows Increase

There were 80 airplanes, seaplanes and other aircraft exported from the United States during 1925, representing an increase of 35 per cent over the 56 exported during the preceding year. A slight decrease—attributable to the falling off in aircraft parts and engine equipment—occurred in the value of all aircraft products exported during the past year, when their value was $783,659, or $14,614 less than the value of combined aircraft products exported during 1924.

Steady Improvement

A significant feature of last year's aircraft exports is that the post war record attained in 1920—when 65 machines were exported—was surpassed. The fact that there has been a steady increase since 1922, culminating in the record attained during 1925, should give rise to a warranted optimism on the part of aircraft producers in the United States, who are competing in foreign markets with heavily subsidized European producers. The following tables show the post war trend of all aircraft product exports, with the exports during 1913:

Exports of aircraft products from the United States, 1913, 1918-1925

Calendar year	Airplanes and seaplanes Number	Airplanes and seaplanes Value	Other aircraft Number	Other aircraft Value	Aircraft parts, except engines and tires Pounds	Aircraft parts, except engines and tires Value	Aircraft engines Number	Aircraft engines Value
1913	29	$81,750	*	*	†	$25,802	‡	‡
1918	48	607,255	*	*	†	14,670,269	‡	‡
1919	44	215,300	*	*	†	3,249,226	‡	‡
1920	65	598,274	*	*	†	554,375	‡	‡
1921	48	314,940	*	*	†	157,608	‡	‡
1922	37	156,630	*	*	471,495	265,481	147	$72,819
1923	46	308,151	2	$900	275,275	58,949	80	65,558
1924	56	411,458	3	1,280	165,472	165,926	146	219,609
1925	80	511,282	§	§	95,248	101,584	73	170,793

*No aircraft other than airplanes and seaplanes were exported prior to 1923.
†Statistics not shown in pounds prior to 1922.
‡Not separated from other internal-combustion engines prior to 1922.
§Included with airplanes and seaplanes.

During 1925 the percentage of airplanes, seaplanes and other aircraft sent to Latin America comprised 65 per cent of those exported to all countries, as compared with 60 per cent of the total exported there during 1924. Argentina was the leading market last year, while Mexico, which lead in 1924 when it received 16 planes valued at $150,300, dropped to seventh place. During the past year, Germany supplanted the Netherlands as the leading market for engines and it is a significant fact that the average value of those exported to the former country last year was over $2,400, indicating that the engines were up to date designs and in all probability not from war stocks. In point of value, the United Kingdom lead as a recipient of aircraft parts, taking the place held by Mexico in 1924, when parts were received by that country weighing 65,736 lb. and valued at $77,340.

Detailed Statistics

The following tables show aircraft product exports by countries of destination, during 1925:

Airplanes, Seaplanes and other Aircraft

Country of destination:	Number	Value
Argentina	25	177,200
Canada	15	14,900
Brazil	10	61,975
Cuba	9	94,000
Philippine Islands	5	83,958
United Kingdom	5	11,320
Mexico	3	5,000
Colombia	2	33,879
Salvador	2	8,800
Java and Madura	1	11,750
Belgium	1	7,000
Honduras	1	1,000
Australia	1	500
Total	80	511,282

Aircraft Engines—1925

Country at destination:	Number	Value
Germany	29	70,558
Canada	11	38,492
Siam	10	1,200
United Kingdom	6	27,676
Netherlands	6	14,682
Argentina	5	14,180
Brazil	2	2,500
New Zealand	2	355
Mexico	1	950
Salvador	1	200
Total	73	170,793

Aircraft Parts except Engines and Tires.

Country at destination:	Pounds	Value
United Kingdom	4,062	48,064
Canada	55,093	26,813
Honduras	10,282	5,029
Peru	3,848	3,430
Netherlands	1,769	2,795
Mexico	2,559	2,788
Argentina	1,832	2,386
Japan	711	1,918
Brazil	3,928	1,710
Cuba	2,234	1,432
Italy	410	1,358
Colombia	5,364	1,053
Russia in Europe	1,014	821
Siam	285	618
New Zealand	434	390
Australia	375	376
Germany	220	250
Venezuela	570	224
China	45	55
Chile	45	40
British South Africa	168	34
Total	95,248	101,584

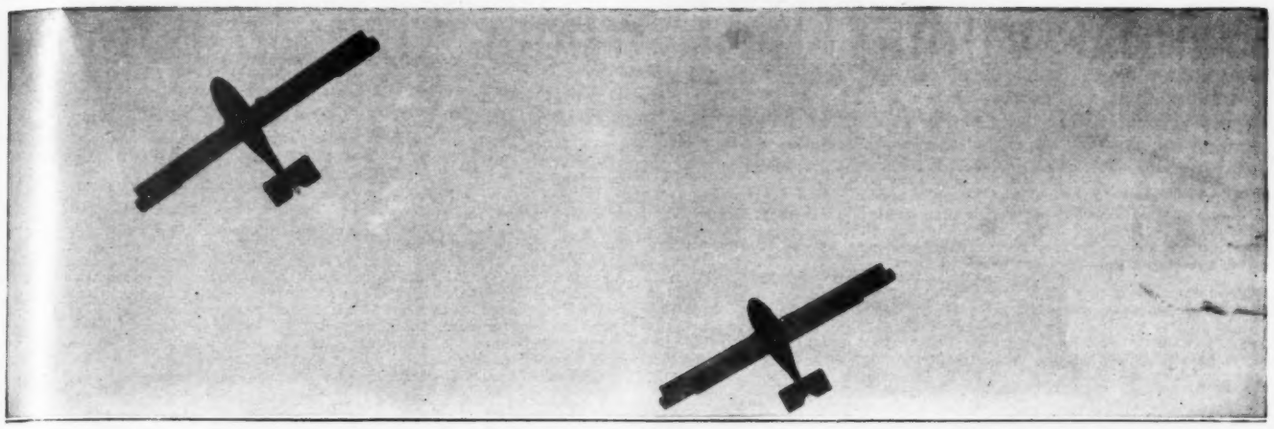
Bureau of Foreign and Domestic Commerce.

A Photography Record

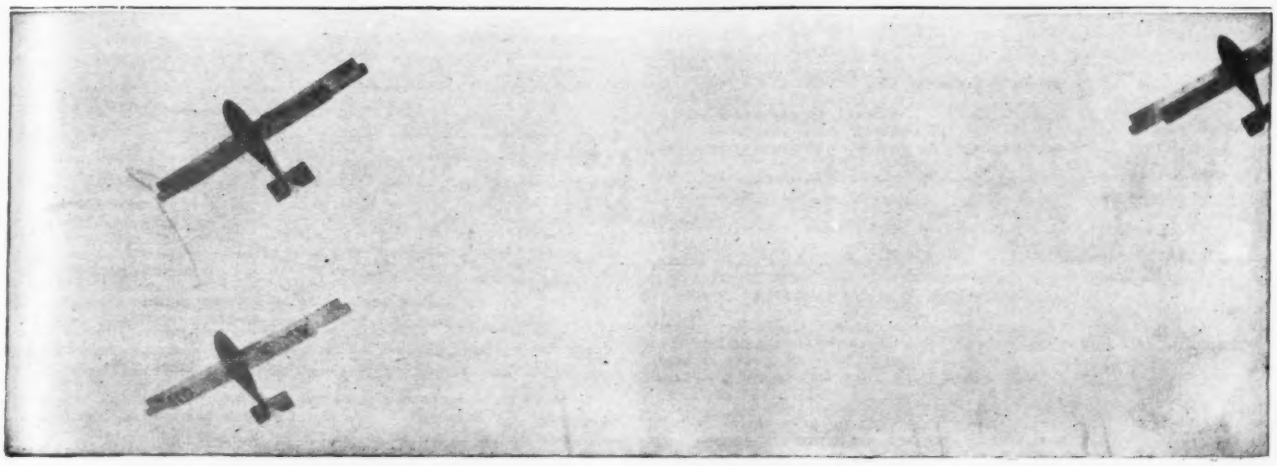
Establishing what is believed to be a world record for commercial non-stop aerial mapping, Robert A. Smith, Fairchild Photographer, flying with Pilot Frank Hawkes of the Compania Mexicana de Aviacion at Tampico, Mexico, remained aloft for a period of 6 hr. 50 min. in the course of photographing a large area which the company has under contract at Tampico.

Another item of interest is the fact that Smith took into Mexico the first Curtiss Reed metal propeller, which he has been using on this work, and which, he estimates, has been the cause of around 500 people knocking their knuckles on it to see of what material it is made.

The Compania Mexicana de Aviacion is a very progressive little squadron tucked away with a fleet of Hisso-Standards, which carry payrolls out to different oil companies in the field. Mr. Rihl, their manager, explains that the reason the money is conveyed by air is on account of the extreme familiarity some folks on the ground used to show to the payroll car when the payroll was transported by road, hence the adoption of the aerial method.



THE AIRPLANE BUILDERS—AND GOODYEAR



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GOODYEAR

AVIATION EQUIPMENT

What Pilots Think About Air Legislation

Pilots Express Many Varied Views on Requirements.

Favors Law Later

Relative to the licensing of pilots and inspection of ships, I think pilots should be left alone for some time yet as it will keep many young men from learning to fly because they think they may not be able to qualify and that it might cost them too much money.

On the other hand, there should be some way of keeping wrecks out of the air and keeping them from being sold to someone who wants to learn to fly and cannot tell the condition of the plane. This causes many crashes and every time the public hears of a crash it makes them more afraid than ever. Last summer a friend of mine bought an old "Canuck" from a man and then offered him $150.00 to teach him to fly and the flier turned it down as he was afraid to fly the wreck himself.

If there is any sort of legislation, I think it should be Federal and should be very cheap and moderate at first. I have been flying almost two years and am at present flying an OX Standard.

I think anything that would encourage Gypsy fliers to fly and use good equipment should be done as they are the ones that are educating the public to fly.

FARELD DAWSON,
Stillwater, Okla.

Names Limitations on Law

My ability to criticize aircraft legislation is based on my being actively and financially interested in aviation since 1919 when I organized the Curtiss Northwest Airplane Company and established a commercial flying field midway between St. Paul and Minneapolis.

During the past seven years I have sold over 200 planes; have had my planes on trips to all parts of the country on various missions, some requiring night flying; have had thousands of passengers travel in my planes but have never had a passenger or pilot injured.

In the northwest we have had very few serious accidents considering the great number of miles flown and I believe that any real pilot making his living through his flying ability and having his money invested in a plane does not require legislation to make him take care of his investment or keep his flying record clean.

As I see it the greatest danger to the general public is from two sources, student pilots and faulty rebuilt work and regulations covering the four following items should make aviation as safe as it possibly can be made.

1. Require any new pilot to pass a rigid flying test before giving him a license to operate a plane for hire.
2. Require anyone or any company that builds or rebuilds planes to submit evidence of their ability to do this work properly before allowing them to solicit this work and issuing such persons licenses to do this work.
3. Require any pilot operating a rebuilt plane to secure a license or certificate of airworthiness from the company that rebuilt it.
4. Require any company in the aerial transportation business and running a regular passenger service between fixed points on schedule to have their planes and pilots pass a regular physical inspection at stated times.

The above regulations should not conflict with the flying of planes by our present commercial pilots who have proven their ability and they should tend to make the new pilots and their equipment much safer.

The cost of enforcing these regulations should not be much, as a great deal of the enforcement work could be delegated to civilian pilots in different sections of the country who have had experience and training to qualify them for this work, thus keeping commercial flying operations away from army control.

I would not like to see aircraft legislation go much farther than I have outlined and would not care to see it under military control. We have aircraft legislation in the State of Minnescta with enforcement delegated to the National Guard and while in some ways it is good, it does seem strange that our wise legislators should spend their valuable time pondering over the manner in which our few pilots may fly and putting them under military observation when we have no laws that stop a one armed man that partially lost his sight in 1892 from skidding around our icy streets in a forty dollar flivver without brake bands.

W. A. KIDDER,
Minneapolis, Minn.

Would Supervise Schools

I believe Jennies, Canucks, and Standards are doomed. They cannot compete for over two or three years more against the new designs at the prevailing prices. These new types do not need rigid inspection. So why complicate matters with a lot of red tape.

Owing to the nature of the work, a license can never be an exact indication of a pilot's ability at all times and under all conditions. Also, it will make the cost to the student flier prohibitive. Cutting down the percentage of young men coming into the game, is a serious objection to pilot regulation.

I do believe, however, that every pilot should have a thorough ground training in aerodynamics, mechanics, construction and maintenance, before he is permitted to fly. As you know, many flying schools, advertising ground schools, have absolutely none. You pay to fly and that is what you get. There is a great deal about aviation that can only be learned on paper or in the shops. It is the foundation of actual flying. I studied all branches of aviation for four years before I started flying. Consequently I soloed in 2½ hr., stunted in 10, my first cross-country flight was 800 mi., over three states and I made it OK with absolutely no help or instruction en route. I attribute the success of that trip to thorough ground preparation. I want to see a STANDARDIZED ground school in conjunction with every flying school in the U. S. That is the only regulation I favor and my solution to the problem. INTELLIGENT understanding and KNOWLEDGE is far better in my mind than any substitute regulations.

K. R. HUGHES,
Laramie, Wyo.

Auto Regulation for Pilots

You certainly hit the nail on the head in your news letter of last week's issue of AVIATION. The aeronautical industry, still in its infancy but progressing rapidly, should not be strangled to death by a great many unnecessary restrictions and common ordinary red tape. Certain rules must, of course, be laid down in time, in order to maintain peace and insure safety, but when these laws are formulated and executed let them be similar to those imposed upon automobiles. The airplane is, after all, very much the same as the automobile, about the only radical difference being the method of propulsion and the lane of travel. The autoist buys his license, pays gasoline tax, income tax, obeys the rules of the roads and has the utmost liberty in the selection of his vehicle and its upkeep.

The flier does not endanger human life any more than the autoist, and, in an airplane accident, the pilot usually suffers with the passengers, which is seldom the case in an auto accident.

Some aviators, in expressing their views, have suggested that only those with experience be given a license and be permitted to fly a plane. How can the student ever gain exprience unless he is permitted to fly! Most of those who are opposed to student fliers taking up passengers have more personal than altruistic reasons for their opposition. After the student finished the course with an instructor, in order to gain more experience and continue to feel the thrill of flying, he purchases a plane and continues "on his own." In the course of time he begins to take up passengers in order to defray operating expenses and the initial cost of the plane, and in some cases he operates in the same town in which his instructor is located. Of course, the latter dislikes such competition and would like to put the student flier out of business in order to have a monopoly on it himself.

I do not favor physical examinations as they are no true criterion of a man's flying ability. Even if a fellow is minus an eye, a leg, or an arm; if he can fly successfully—then let him fly. Autoists take no examination and some of the most disabled are the most careful drivers. Why prevent a war veteran, (or anyone, for that matter), from enjoying life simply because he sacrificed a part of his body for his country's sake! Also, inspections of aircraft seem to be well-nigh useless. A writer in last week's AVIATION pointed out a very striking example of this. As a flying field near this city, over $6,000 worth of aircraft was "cracked up" by Reserve Army Officers last year, while a commercial flier, operating at the same field, took up passengers every day in a wartime Jenny and never had a single accident. This flier himself said that the main reason for this was that the Reserve Officers were flying government owned ships while he had to buy and keep up his own, hence he was more careful.

It is all right to have certain "rules of the air" and to have aviators pay a tax to operate their planes. A license plate should be issued and this should be attached to the fuselage of the plane, just as with the automobile. In this way the state has a list of all ships within its borders and can more easily locate planes which are stolen or lost. No more examination should be required of an aviator than of an autoist, and no more of an inspection of an airplane than of an auto.

What we want is progress—not red tape!

I hope that all fliers will rally to the cause and put aviation on the pedestal where it belongs, high above the heads of insidious grafters and politicians.

R. ALVIN HUG,
Cincinnati, Ohio.

For Restriction of Inexperienced Pilots

Personal observation of the half dozen or more fatal accidents which have occurred during the past six years in a radius of one hundred and fifty miles of York has convinced that in every instance the fault could be laid to inexperienced pilots and I have consistently refused to give instruction because I felt that it would be doing the embryo pilot a grave injustice when he received the impression that he was a qualified pilot upon completing a ten day's course at the cost of a hundred or two hundred dollars.

Accordingly, I am in favor of restricting the operations of inexperienced pilots and preventing them from unduly hazarding the lives of innocent passengers to the great detriment of the aircraft industry as a whole. However, I think that any compulsory inspection or code regarding the planes themselves can safely be left till some time in the future. An A No. 1 pilot is a pretty good judge of the capabilities of a plane even when operating with what is generally termed obsolete equipment; he is careful not to strain the plane beyond its strength.

Of course it is quite impossible to legislate brains into any body, but you can prevent them from harming any one except themselves and that is what should be done. I also suggest that some means of weighing the value of the opinions which have been submitted to you be found on the basis of the experience possessed by the writers and you might reach some interesting conclusions. I think that you will find the old time pilots almost unanimous in their recommendations.

KARL ORT,
York, Pa.

Federal Ruling to Avoid State Laws

We must rouse ourselves or we will find the newly born babe, Commercial Aviation, has the measles. I am not in favor of legislation at the present time but if we don't get federal legislation now we will find that every hamlet and town will have its own little pet law. They are starting out here already. If we must have federal legislation let's have a bill with as few teeth as possible.

I own the only aviation field within thirty miles of here. Organized the Santa Barbara Aero Club and was Commodore for past two years.

EARLE OVINGTON,
Santa Barbara, Calif.

Sees Condemnation in Legislation

I wish to compliment AVIATION for the stand taken in the News-Letter of Dec. 28. I consider the points brought out in this letter to be really constructive, broad-minded and worth-while.

I have conducted an experimental station and maintained a flying field since 1910. Having built four planes to various stages of completion, I finally succeeded on my fifth attempt, in building a real plane, with an OX-5 engine, that has flown successfully. I also bought a "Jenny" and have used it both for commercial flying and for comparison with the one I built. My total time in the air is something like 110 hours, composed of cross-country, passenger, advertising, instructing and joy-flying.

In regard to the impending legislation, if I am to be told by some government inspector that I am not a safe pilot to fly an airplane and am refused a license; if my planes are condemned as not airworthy, and I am told not to fly them at all; if my field is not a safe one and conducted in a safe manner and is consequently of no use to those who are permitted to fly; then the way is going to be that much harder for those who are better equipped in every way than I am. For those who are not so well equipped, any fair treatment at the hands of the government inspector would rule them out entirely. This is, of course, based on the supposition that this legislation is to be administered in as fair a manner as possible. If it is not, and only those can fly who know how to, or are in a position to, "pull the strings," then, every pilot and operator should, for his own defense, demand either something different in regard to legislation, or none whatever, as, at any time, he may incur the displeasure of the "powers that be" and be told to "stay on the ground."

I am, and always have been, a widely patriotic American and to think that my government, the one I revere and respect, is even thinking of forcing me, and most of the other pilots to give up that which I love so well, and in which I have invested my savings, which came by hard work and self-denial, that I might in time make my life work, is, to put it mildly, past all understanding. This too, when I have not injured a single person in any way.

I believe the government should help to keep in the air and help to put there, all the aircraft possible. The unfit craft and pilots are eliminated rapidly enough, with nothing like the injury to either those who ride or drive them or to the poor, timid, innocent bystander, that some would have us believe. An automobile, which could not pass any inspection as to safety requirements, with a driver who does not know even how to start or stop it, can, after he gets help in starting it, go on our highways and endanger more lives and property in five minutes than any airplane that any fool in the world would try to fly. I know of lots of cases where this was a fact and so does everyone who reads this letter.

Why should the government not assist in marking cities and towns? Every man engaged in aerial service would be glad to cooperate. Also, to help spread information as to flying fields, their location, size, etc. that are available to the cross-country flier. Every operator should be glad to make his field properly and furnish such information to the government which would enable it to spread helpful hints, knowledge and data so that it would be available to every pilot, whether Army, Navy, commercial or pleasure. Are we to have the same conditions here as in England, where it is almost out of the question to fly or put anything new on the market?

If I design and construct a plane and submit it for inspection as to air-worthiness, and because it does not conform to the inspector's ideas of safety (it may have something new in it), regardless of my willingness to prove, by any reasonable test, either flying, sand load test, or in any way he may suggest (that would not be wanton destruction) that it is airworthy, is that plane to be condemned, and am I to be told "keep it on the ground"? These conditions, I understand, are in force in England to-day and it spells almost an end to anything new except what the Army or Navy and perhaps a very few manufacturers, may develop. The number of flights and the mileage flown by those engaged in aerial service are absolutely unknown because there is no way to collect such data. There are many pilots, like myself, scattered over the United States, whose activities are unknown outside of perhaps two or three countries. The thousands of miles we fly, the hundreds of passengers we carry, the students we instruct, the advertising we do, we get no credit for from those who would legislate all of us, or most of us, out of existence. They try to blame most of the accidents on us, try to belittle us in every way, but the public would only know what an airplane looks like from the pictures they see, if it were not for us.

During the summers of 1924 and 1925, I have had a large number of people visit my field and say to me: "This is the first airplane I have ever seen close enough to know what it really looks like. I have only seen them away up high." Again, I have carried as passengers many who, before they visited my field, were stocked up with newspaper accounts of accidents and were very emphatic in their statements that they didn't care how high up they went so long as they kept one foot on the ground. They not only rode with me once, but many have "repeated" and like it very much.

No legislation, however strict, will prevent all accidents or materially reduce them. The very best of pilots and planes will sometimes go wrong. The number of forced landings that the Army has had, under military inspection would prove this.

Are we to be placed in a position where we will be made helpless by an inspector whose actions and opinions govern, instead of the law which is the cause of all the trouble? If he orders us to replace a certain part before the craft is considered airworthy, which, we will say, takes from one half to two days, would we have to stay on the ground and lose money until he returned, maybe one, two or six months later? If this legislation is passed, those in charge will then enforce its provisions on those engaged in aerial service, just as much, and probably more so than on the larger commercial air lines, regardless of the opinion that this legislation, known as the Bingham Bill, is only supposed to be enforced on big commercial lines doing an interstate business.

R. M. FOSTER,
Homewood Junction, Pa.

Believes Air Mail Should Control

If pilots and operators cannot agree on regulation how can outsiders know what to do?

If the air mail personnel had charge of inspecting pilots and examining planes, I am sure we would get a square deal. Pilots ought to be classified and the public informed of their standing. Pilots should have their own organization, uniform and regulations. Leaflets ought to be dropped by members on all cities giving the pilots ideas.

M. K. RIDDICK,
Washington, D. C.

Believes in Moderate Law

If our legislators, both state and federal use good judgment in framing our aerial laws, aviation will be helped and the public will be safeguarded, but the interests of all must be considered.

The interests of the flying public should be guarded by having all aircraft inspected and passed upon as airworthy. The safety of those on the ground who do not fly should have their rights protected too. Students taking instruction should have reliable planes and competent instructors.

But the person most to be considered in this discussion is the pilot. Since the Army and Navy fliers are and always will be governed by their own officers, it leaves the commercial pilots to be considered. If commercial aviation is to be popular with the public the small one plane operator as well as the larger companies will have a part. The latter will of course qualify in any test that any reasonable law would require. But the law that is finally passed must not be one that will legislate the small operator out of existence.

The general public is eagerly wanting to fly. But they must be shown first: in other words flying must be *taken* to each community. This can only be done by the local flier in each community. The larger companies will of course fly from one large city to another over a certain route—generally the air line. Unless some plane is forced down enroute the natives along the line will never even know "if it is any colder up there than it is down here".

The writer is simply one cut of the large herds who is interested in flying. I have had an ambition to fly since I saw Roosevelt take a ride some 12 or 14 years ago. So in line with that ambition, a Canuck was purchased at Toronto, Canada in 1918, price $2000 plus $200.00 inspection trip by an Army Lt., plus $200.00 freight plus $1000.00 for the first little crackup, by said Lt. I had expected to learn on this plane and did get about 35 sec. (at a little over $100.00 per second) before the Lt. put it entirely out of commission. Then I bought some instruction—18 hr. at about $300.00 per. Then I bought a Jenny and soloed, having waited until I was past 40 years of age. Since that time over 200 hr. have been spent around this community "showing" the natives that most anyone who really wants to badly enough can fly.

These details are given simply to show what can be done by the local flier in educating the general public in making a practical use of the airplane; even of the Jenny Canuck Standard type.

LEE R. BRIGGS,
Memphis, Mo.

Emphasizes Need of Flying Fields

It is a well known fact that the future success of commercial aviation depends not only on the modern planes and skilled pilots, but largely on the cooperation of the towns and cities with this unit in helping establish flying fields over the country. I would like to call attention to the remarkable progress Athens, a small town in Georgia, is making along this line. This town of about twenty thousand population has already organized an aeronautical committee; the country has improved and laid aside enough land to make one of the very best flying fields. This field will answer for, or come up to the Air Mail field specifications. In the last year there has been erected a modern hangar. You can realize the importance of this field when you see that it will not only be used as a sub-station for mail planes, but is a direct key to Florida, a state, which, in my opinion, will advance in leaps and bounds in commercial aviation.

Until the towns and cities of this country awake to the fact that flying fields alone are the paramount features to a successful and organized commercial air unit, we are going to find it hard going. More power to the man who can convince the general public that flying fields are just as important as their state roads, and much less expensive.

A. H. COMU,
Huntington, W. Va.

Education, Not Regulation

The question comes to my mind, "Why all this regulation?" The only answer I can think of is that it is an attempt to make Aviation safe for the public. The same old cry from the throats of those who have never been in an airplane, or if so only once. They won't go again because they think it isn't safe. You and I and the rest who have spent hours holding on to the controls wouldn't ride in the New York Subway if we didn't think it was safe.

We don't need regulation—we need education. And in spite of this fact I still see a lot of pilots who like to strut in front of a crowd with a loud mouth, telling the ignorant layman how dangerous it is, how he nearly crashed that time, etc., just to make the impression that he is a superman or a daredevil. The Public had to be educated to riding in railroad trains, steamboats, and automobiles so why not airplanes? Regulation does not stop accidents in any of the aforementioned modes of transportation, neither will it stop airplane accidents.

Undoubtedly we will have some sort of regulation, but lets hold it down as much as possible. Like any other healthy American kid aviation will grow without much attention, too much of which spoils the best.

ALBERT GRAHAM,
Philadelphia, Pa.

Military Fields for Civil Pilots

In this section of the country, we are very much interested in the development of aviation, both military and commercial and I hope that legislation, now pending, will encourage instead of discourage, all kinds of commercial flying. However, I have no definite ideas or suggestions to make regarding the construction of such legislation. Among many other things, I am very strongly in favor of military flying fields and facilities being made available for commercial planes under reasonable regulations.

I have been working very hard for the past three or four years, developing interest in aviation in this state and, at various times, have addressed practically every civic organization in this state in the interest of local development in aviation of all kinds.

JOHN CARROLL CONE,
Arkansas.

Illegitimate Air Mail Pilots

The attention of Postmaster General New has been directed to the fact that unscrupulous persons, imposters and the like are visiting portions of the country representing themselves to be air pilots or connected with the Air Mail Service in one capacity or another.

Through misrepresentation, fraud and connivance, these same imposters have been able to put over deals whereby they have in many instances run up hotel bills, received modified attention for which they have not paid, purchased rifles, stamps and other articles on the strength of their alleged connection with the Post Office Department.

Both Rush D. Simmons, Chief Inspector, and Second Assistant Postmaster General W. Irving Glover, have received reports on several cases of this kind, and it is needless to say that the guilty ones will be brought to justice just as soon as they are caught.

The most recent case of the kind to be brought to the attention of the Chief Inspector has to do with the machinations of a man claiming to be a pilot of the air mail service. At Salt Lake City, Utah, where he operated, he produced air mail stationery and blank forms for an automobile dealer in an effort to secure a machine. He tried the same scheme at Oakland, Calif., and attempted to buy an automobile by giving a check in payment, after producing his alleged credentials to the dealer.

He is also alleged to have registered at a hotel in Sacramento, Calif. He claimed to have flown an air mail plane on its western trip and stated that he was en route to Santa Monica to fly a new mail plane east.

Not long ago, the postmaster at Wilmington, Del., notified the Department that a man, representing himself to be an air mail pilot, called at the post office there and attempted to get a check for twenty-five dollars cashed. He said he was engaged in the over-night mail service from New York to Chicago. Inspectors are now on his trail.

A man, who said he was engaged in the inspection of mail planes, called on a physician attached to the Washington University at St. Louis, Mo., for treatment for kidney trouble. The doctor responded, but he got away and the physician is now endeavoring to collect for his services.

An individual alleged to be connected with the Air Mail Service, obtained a rifle at Franklin, Ariz., for which he gave a worthless check for fifteen dollars in payment. He declared the rifle was to be used in safeguarding a mail plane that had fallen eight miles north of Lordsburg, New Mexico.

Maj. Thomas C. Lanphier, U.S. Air Service, who is accompanying the Detroit Arctic Exposition under the command of Capt. G. H. Wilkins

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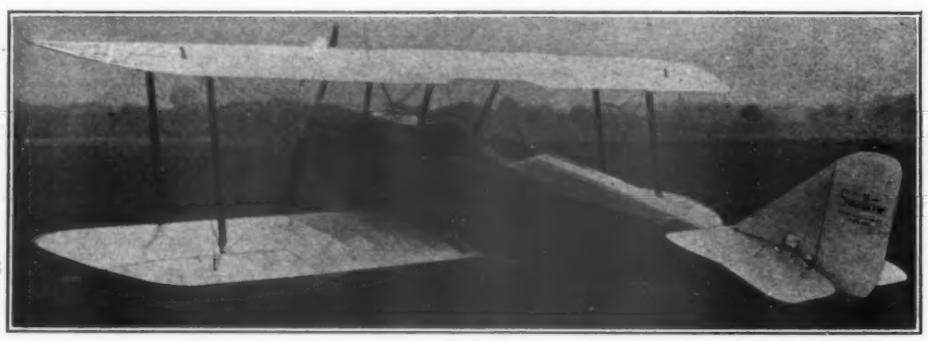

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MUNCIE AERIAL CO.
MUNCIE, IND.

Swallow Airplane Mfg. Company, Wichita, Kans.

WE STILL HAVE SOME AVAILABLE TERRITORY

Importance of Pilot's Views

To the Editor of Aviation:

It gives us great pleasure to note the suggestions in your issue of Feb. 22 of the importance of obtaining, for the Department of Commerce, the views of commercial pilots as to Federal regulations. Certainly your valuable paper has rendered good service in obtaining and publishing such views, which is much more difficult than those might suppose who have not tried it.

If any person interested in aeronautics desires personally to meet the Secretary of Commerce, we invite them to call at our headquarters here and we will make it our personal business to see that such opportunity is obtained.

Godfrey L. Cabot.

United States Civil Service Examination

The United States Civil Service Commission announces the open competitive examination for the position of Junior Aeronautical Engineer.

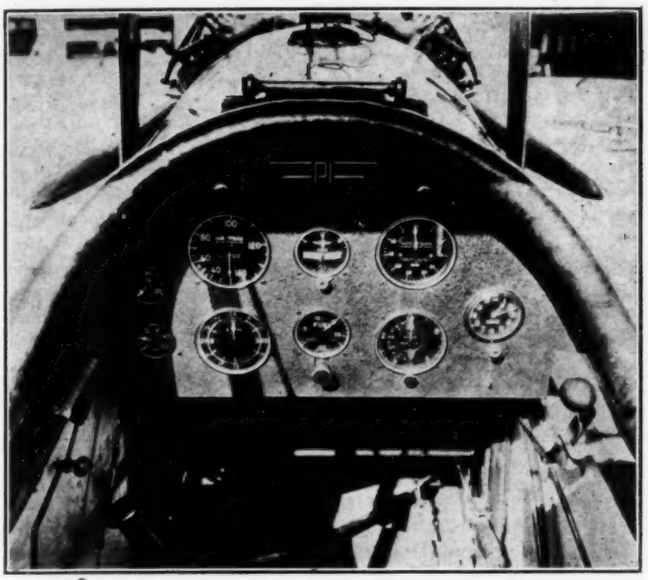
Receipt of applications will close April 17. The date for assembling of competitors will be stated on the admission cards sent applicants after the close of receipt of applications.

The examination is to fill vacancies in various branches of the Government service throughout the United States. The entrance salary in the District of Columbia is $1,860 a year. After the probationary period required by the Civil Service act and rules, advancement in pay may be made without change in assignment up to $2,400 a year. For appointment outside of Washington, D. C., the rates will be approximately the same. Promotion to higher grades may be made in accordance with the Civil Service rules as vacancies occur.

The duties of this position are to perform such work as routine testing, performing field work, making computations, assisting in conduct of experimental research tests, compiling reports, and handling technical correspondence.

Competitors will be rated on general physics; pure mathematics, and practical questions on aeronautical engineering, including applied mechanics.

Full information and application blanks may be obtained from the United States Civil Service Commission, Washington, D.C., or the secretary of the Board of U. S. Civil Service Examiners at the postoffice or customhouse in any city.



Modern Flight Aids.

Instrument installation by the Pioneer Instrument Co., showing: top row, left to right,—oil pressure gage, air speed indicator, bank and turn indicator; bottom, left to right,—radiator thermometer, tachometer, fuel level gage, altimeter. The electric clock and control switch complete the dash.

AIRPLANES FOR SALE

We sold over $110,000.00 worth of airplanes, motors and parts last year and still have a large number for sale. We believe the prices on airplanes are at their lowest, and a small deposit on any of our airplanes will hold same for spring delivery. We expect a sharp advance in prices very soon.

We still have plenty of Standards, Jennies, Canucks, Orioles, D.H.'s with Liberty motors, Spads less motors, T.M. Scouts with and without motors. A large number of these airplanes are set up, test flown, and ready for immediate fly away delivery. Come and take your pick.

NEW STANDARD J-1 AIRPLANES with guaranteed overhauled Hispano-Suiza motors, 150 H.P. $1500.00
NEW STANDARD J-1 AIRPLANES with new OXX6 motors 1300.00
NEW STANDARD J-1 AIRPLANES with Government overhauled OXX6 motors 1100.00
NEW STANDARD J-1 AIRPLANES with new OX5 motors 1100.00
NEW STANDARD J-1 AIRPLANES with Government overhauled OX5 motors 900.00
NEW STANDARD J-1 AIRPLANES without motor 650.00

These airplanes come complete with tools and instruments and the front seat is built so as to accommodate two passengers. These airplanes have been reconstructed and new longerons, new controls, new wires, new struts, new fittings, new instruments were installed where needed. One-third deposit will hold any of the above airplanes for spring delivery, storage and insurance free.

No bond required
No charge for breakage

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76 Students Graduated in 1925

We guarantee to solo our students regardless of the number of flying hours required. We also furnish planes at very reasonable rates for those who wish to qualify for the F.A.I. pilots certificate and we maintain an employment agency for our graduate pilots.

The flying school of the Robertson Aircraft Corporation is one of the oldest and best known in the United States. Our instructors are ex-army aviators and are mail pilots with wide experience and our training equipment is the best obtainable. In over eight years of operation our students have never damaged a ship in their solo flights.

The flying field is approximately six miles from St. Louis and is easily accessible by railroad, street car and hard surfaced roads. It is the largest and best privately owned field in the country and the International Races of 1923 were held there. Mail planes arrive and leave daily.

Our course requires about two weeks, depending on the individual, and after its completion the refinements of the art can be gained only from experience. Commercial aviation is a rapidly growing industry. Don't delay! Enroll now!

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LAMBERT-ST. LOUIS FLYING FIELD, ANGLUM, MO.

AIRPORTS AND AIRWAYS

Detroit, Mich.

By Leslie S. Gillette

February's snows and cold winds apparently seem to act as a stimulant to winter flying in these parts. Almost 2,000 aviation-minded Detroiters were at Packard Field last Sunday to witness the first official flights of the new Stinson-Detroit plane. Earlier in the week, over 3,000 people attended the inauguration of the Detroit-Cleveland, Detroit-Chicago contract air mail service at the Ford Airport.

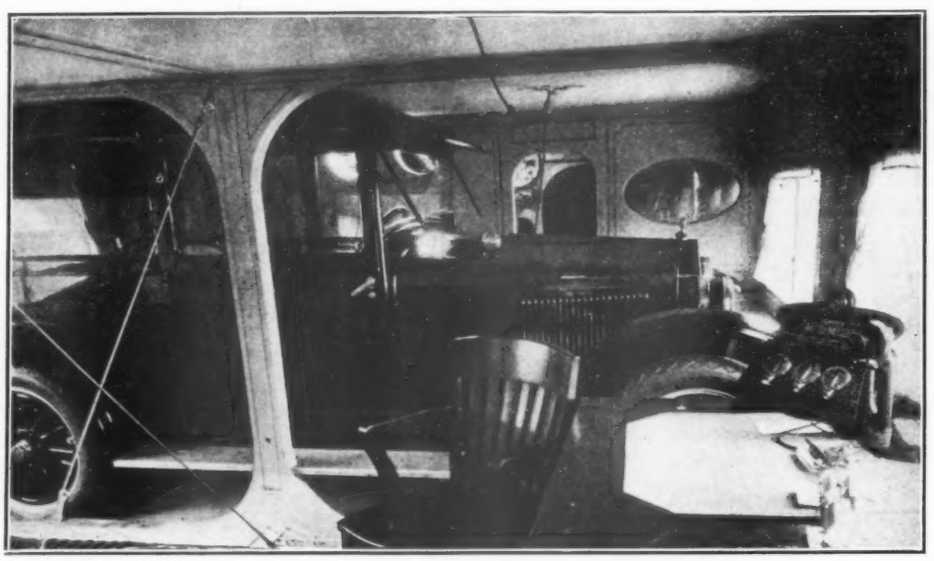
Had it not been for the ankle-deep snow and the near zero weather, one would have imagined a special summer air meet was being staged. While a 30-piece band of the U. S. Letter Carriers Band played popular numbers, Henry Ford and Edsel Ford loaded the Cleveland mail plane with six sacks of letters. In addition to three other Stout metal monoplanes, six PW-8 and PW-8A Curtiss pursuit planes and a Douglas Transport from Selfridge Field were lined up. Among the civilian planes to the rear of these machines were Alfred Verville's new folding wing OX5 job, a Waco, Travel Air and several Jennies. After the mail plane had got away followed by the pursuit planes and transport, Overcashier took off in a strong head wind in his trusty Jenny. About 400 ft. up, the OX5 died and Overcashier managed to make an undamaged, though bumpy, landing, down wind in a small clearing close to the field. It was fortunate for aviation in these parts that the meet was not marred with what might possibly have been a bad crash.

A considerable portion of the structural steel work is erected on the new Ford-Stout airplane factory. The new building, which replaces the one completely destroyed by fire six weeks ago, is three times larger than the former plant and it is expected it will be completed early in the spring.

To show the versatility of the third Detroit-designed-and-financed plane to be built in quantities, Eddie Stinson staged a special demonstration. Eddie, and two of his four passengers on the first flight, entered the enclosed exhaust-heated cabin without hats and with their shirt sleeves rolled. Pressing the electric starter, the Wright 200 hp. Whirlwind was run at full throttle without "chocks", the landing wheel brakes, which are a special feature of the new steel duralumin frame biplane, holding the plane stationary.

Releasing the foot pressure on one of the wheel brakes, the machine turned around in its own length unaided, and took off in a remarkably short run. Landings were made with the brakes "set" and the heavily loaded plane came to rest in considerably less than 100 ft. At no time was there any tendency on the part of the plane to nose over when the brakes were on. Numerous flights were made during the afternoon and several prominent business and civic people were carried. Among these were William B. Mayo, chief engineer of the Ford Motor Co. and his daughter.

While a guest of honor of the Detroit Flying Club, Eddie Stinson spoke of Detroit being the center of the aviation industry just as it is the leader in the automotive field. To do this, he continued, business must be conducted along approved modern lines and all financial deals must be clean and square. "No stock in aviation development companies will be sold to widows and orphans, so that the past good



RB2 Transport Plane as extensively flown with Essex Coach, office equipment and 8 men.

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record of the aviation manufacturing industry in this section of the counry, will be maintained" Stinson concluded.

As an example of the tremendous growth of the airplane building industry, Stinson stated that, during a recent visit to the plant of the Advance Aircraft Co., Troy, Ohio, manufacturers of the Waco planes, he found 65 skilled workers turning out six complete planes every week. The workmanship and precision entering into the construction of the Waco planes was held to an unusually high and rigid standard.

When Gen. William Mitchell arrived in Detroit on Feb. 27, as part of the nation wide lecture tour, he was to be met at the Michigan Central Depot by a large force of well known fliers and conducted to his hotel by a fleet of several hundred automobiles. Entertainment during the day, including visits to the large automobile plants had been planned and the several local flying fields were to be handled by the Detroit Flying Club. At most of the fields, the latest Detroit built commercial planes were on display and the General was to be invited to fly any if he so desired. Almost one half of the main floor of Orchestra Hall where Mitchell was to speak was taken over by the Detroit Flying Club, who have arranged for the interior decorations and the cheer leading. All transportation, entertainment, decorations and visits were handled by special committees of fliers appointed by the Flying Club.

New England News

By Porter Adams

From Bangor, Me., comes the announcement of the formation of a Bangor Chapter of the N.A.A. on Feb. 11. The officers of the new chapter are:

President, Edward R. Godfrey,
Vice-Pres., Garrett D. Speirs.
Vice-Pres., Lieut. Robert W. Lowell,
Secretary, Lieut. Fred R. Rowell,
Treasurer, E. Y. Eldridge.

In addition, there will be nine directors, including the five officers already named, and it is expected that this chapter will be of great value in developing aviation in Bangor and vicinity.

There was very little flying at the Boston Airport during the week of Feb. 15-21, on account of the snow and slush which covered the field. The only flying time was 145 minutes which was made up of 16 separate flights and the plane used was the Airport JN on skiis.

Daniel Sayre, president of the Boston Airport Corporation, returned from his trip, which included some time spent at the Travel Air factory in Wichita, Kan., and an inspection of the flying fields in Florida and the South. Sayre reported that 16 Travel Air planes have been sold within the last few weeks.

Capt. Robert Raymond spoke before the Army and Navy Club of Boston at their Club rooms in the Hotel Bellevue, on Wednesday night, Feb. 16, telling of his experiences during the war. Captain Raymond received the D.S.C. and Croix de Guerre, with palm, for his work with the 27th Squadron, commanded by Colonel Hartney.

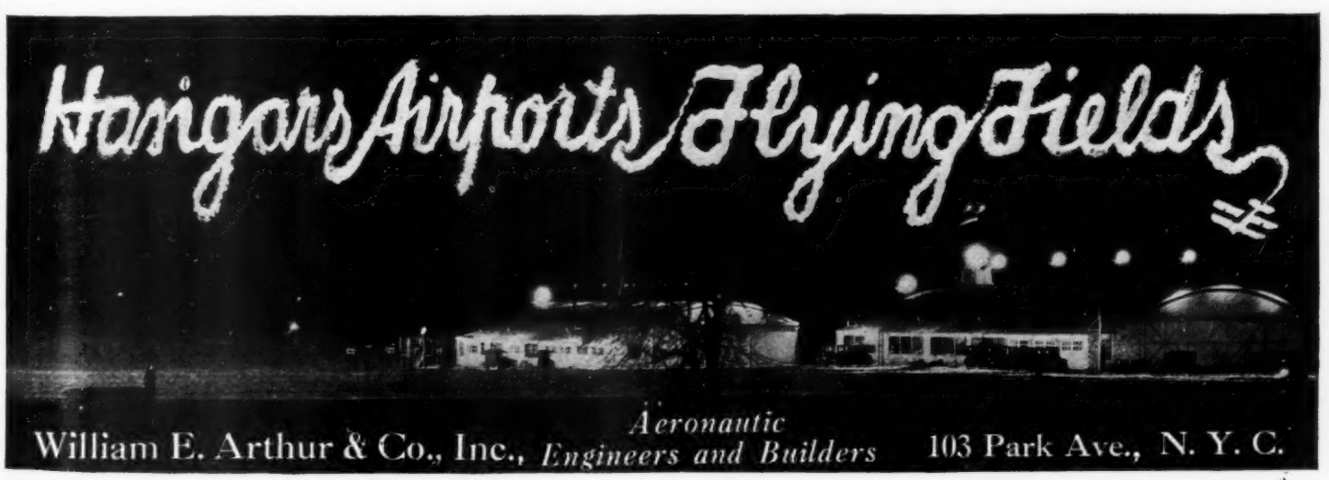
Cy Caldwell, late of Cleveland, but now of Boston, is in Washington at the present time, where it is reported that he is very busily engaged in selling Cyphibians to the Army and Navy air services and it is also reported that the National Geographic Society is considering making special arrangements with Cy to prepare a series of articles for them on his Travel Air adventures.

Monmouth News

By Ralph B. Eckley

Five new Waco airplanes have been delivered to the Mid-West Airways Corp. during the past two months by the Advance Aircraft Co. of Troy, Ohio. All of the machines have been flown from the factory by John Livingston, manager of the local company, and three of them have been delivered to purchasers.

The Campbell Airplane Co. of Moline, Ill., ordered three Wacos, two of which have been delivered. Another Waco



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Five new Liberty Motors complete with spares worth $2000.00 each, five used less than twenty hours worth $1200.00 each, three new crank cases worth $500.00 each, thirty good cylinders, all for $11,000.00.

Shipped subject to inspection, guaranteed as represented.

New six cylinder Hawk model Rolls-Royce 120 H.P. wonderful Motor $500.00. New Liberty 6 for $750.00.

Ten complete OX 5 Motors, we guarantee them equal to new, used less than twenty hours $1500.00 for the lot. Five OX Curtiss Motors minus magnetos and a few minor parts, some of them are new. Also five complete OX 5 Motors that need overhauling $150.00 each. $1,000.00 for the lot including extra spare parts.

New Lawrence 28 H.P. two cylinder, aircooled Motor complete $85.00.

Complete Mercedes 220 H.P. V-2 Curtiss, large 600 H.P. Ansaldo, new Hall-Scott, Anzani and other motors. You take no chances. Shipments guaranteed satisfactory, subject to inspection of purchaser.

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FOR EXPRESS, MAIL AND PASSENGER LINES, TAXI SERVICE, MAPPING, SKY-WRITING, ETC.

Powered with either the 260 HP Salmson water cooled radial or the 200 HP Wright J-4 Whirlwind air cooled radial.

Deliveries are being made in numerical order and orders for early spring delivery must be placed now.

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Write or wire now for appointment

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was sold and delivered in February to McBoyle's flying field at Galena, Ill. Several other orders for Spring delivery have been received.

Roy Pierce, of Macomb, Ill., a former Army pilot, has purchased a New Swallow from the Mid-West and took delivery on March 1. Mr. Pierce formerly operated a Curtiss JN4 at Macomb. He has erected a permanent hangar on his flying field for the machine.

R. M. Hinkle, of Wallburg, N. C., who has been taking a course in flying at Monmouth, has purchased a Laird Swallow airplane from the Mid-West company, which he will fly back to the East coast this Spring, where he plans to establish a flying field in the Winston-Salem, N.C., territory. Mr. Hinkle disposed of a prosperous garage business in his home town and came West to take his flying training and to secure an airplane.

Two other used planes have also been disposed of to operators of commercial fields in western Illinois during the past few weeks. Since taking over the Illinois agency for the Waco, John Livingston has demonstrated the plane to pilots in Chicago, Peoria, Moline, Galena and other centers.

Wins Air Race to Child

Mrs. B. M. Halbert arrived at the bedside of her granddaughter in Decatur, Ill., on Feb. 25, after a twenty-four hour trip from San Angelo, Tex., by airplane and trains.

She boarded an airplane at Forth Worth early on Feb. 24 and flew North until darkness forced a landing at Butler, Mo. She traveled the remainder of the way by rail.

In discussing the air journey, Mrs. Halbert declared that there had been no cause for worry. After riding through the rain for three hours "we just picked a nice field and came down," she said.

Clover Field Fliers

The "Clover Field Fliers" of Hollywood, Cal., are preparing bookings for their 1926 season. This group of stunt stars is one of the best known on the western coast. They indulge in wing walking, formation flying, plane to plane transfers, upside down flying, parachute jumps, etc. Through letters, publicity and advance agents the flying circus has worked up a good show business. Guarantees are obtained from chambers of commerce, clubs, groups of merchants or other citizens. Arrangements are most often made at the time of the state, county or city fairs and the show put on by the fliers has proved to be a great attraction. Besides their circus work the "Clover Field Fliers" do photographic work and passenger carrying.

Germans Plan Giant Boat

As a result of Raymond Franco's successful flight across the Atlantic in a Dornier Wal the Dornier company is planning to build a giant flying boat for trans-Atlantic passenger and freight services. It is expected that the new planes will have engines totaling 3,000 hp.

One of the special features is the buoyance planned for the planes, which, it is believed, will be capable of keeping them afloat for many hours with a full load of passengers and will enable them to withstand heavy seas.

The wingspread will be 165 ft. and the motors will be built in the wings. For the passenger planes every luxury is planned.

The planes will be constructed on the Dornier wharves at Freidrichshafen, so that their seaworthiness can be thoroughly tested on Lake Constance, provided the Interallied Military Control Commission grants permission, otherwise the Pisa plant of the company will be used.

Saved in Parachute Leap

Lieut. Frank O'D. Hunter, operations officer at Selfridge Field, made a forced parachute leap from his plane 500 ft. to the ice of Lake St. Clair when his plane caught fire. Slight burns and bruises were the extent of his injuries. He blamed ignition trouble for the fire.

Lieutenant Hunter, who brought down seven German planes during the World War, suffered a broken back in a plane

crash near Buffalo, N. Y., 18 months ago and was in a hospital several months.

Soon after resuming flying after the Buffalo accident, Hunter was obliged to jump 2,000 ft. from a plane over McCook Field, Dayton, Ohio, when the stabilizer frame of his plane collapsed.

United States Air Forces

Douglas O-2 Planes For Chanute Field

Douglas O-2 airplanes being constructed by the Douglas Aircraft factory at Santa Monica, Calif., for the Army Air Service, are now being completed, and it has been customary for pilots, at stations to which these ships have been assigned, to be detailed to ferry them to their home stations. A flight consisting of Maj. W. C. McChord, Capt. Chas. B. Bubb, Lieut. J. V. Hart and Lieut. H. G. Peterson, departed recently for Santa Monica by rail to receive the ships assigned to Chanute Field. The men were delayed at the Douglas Factory for a few days, and Major McChord and Captain Bubb took advantage of the delay by flying the O-2's around the factory airdrome. Staff Sgt. L. J. Smith, Sgt. C. E. Butley, Pvts. H. D. Castro, Remy Marcal and Jacob H. Brownstein of Crissy Field, Calif., were awaiting transportation to Chanute Field to take different courses in the Air Service Technical School, and they were assigned as passengers on the Douglas O-2's, thus saving the cost of transportation by rail. After a five days' stay at Santa Monica the flight took off for San Diego enroute to the home station, accompanied by Capt. O. H. Quinn, also ferrying an O-2 to his home station, Bolling Field. The flight was uneventful, delays being caused only by inclement weather.

From San Diego the flight made hops to Tucson, Ariz.; El Paso, Texas; San Antonio, Texas; Muskogee, Okla.; and made the last hop from Muskogee, Okla., to Chanute Field, arriving 12 days after departure from Santa Monica. The O-2 assigned to the Air Service Technical School has been doing its allotted flying, and it seems that all the pilots are satisfied with its performance. The O-2 climbs and performs very well, is powered by a Liberty-12 motor, and carries fuel for a flight of eight hours.

Macready's Altitude Put at 38,704 Ft.

The official height reached by Lieut. John A. Macready of was set at 38,704 ft., or 882 ft. under the record held by a McCook Field in his dash for the world's record on Jan. 29, French flier. This was determined in a report received by McCook Field officers from the Bureau of Standards at Washington, where the record was calibrated.

When Lieutenant Macready alighted after the flight, instruments in his plane showed that he had attained a mark of 35,900 ft.

With numerous changes expected to increase the height attaining ability of the plane effected, Lieutenant Macready is planning to make another attempt at the World's record within the next few weeks.

Regains Control After 3,800 Ft. Drop

Lieut. David R. McCauley of the Maryland National Guard Flying Corps, believing that the engine of his airplane could not be stopped while he remained in the rear cockpit, climbed to the front cockpit while his plane was 4000 ft. above Chesapeake Bay. By the time he reached the front seat, however, the plane momentarily left uncontrolled, had nose-dived 3,800 ft.

When within 200 ft. of the water, Lieutenant McCauley managed to turn the plane parallel with the surface. He then piloted the machine to Logan Field and landed with the en-

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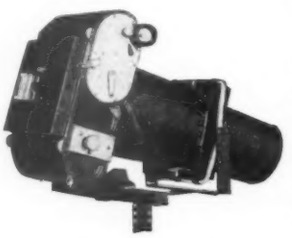
This latest Eastman Aero Camera does all that either military or commercial work requires: both mapping and "obliques."

It is hand-operated. One crank winds the film and resets the shutter, an unique advantage. A Venturi vacuum tube holds the film flat in the focal plane. Shutter speeds are 1/60 to 1/280 second. Capacity: 100 exposures, 18 x 24 cm. (7 1/16x9 1/2 in.). Made of aluminum, light and rigid.



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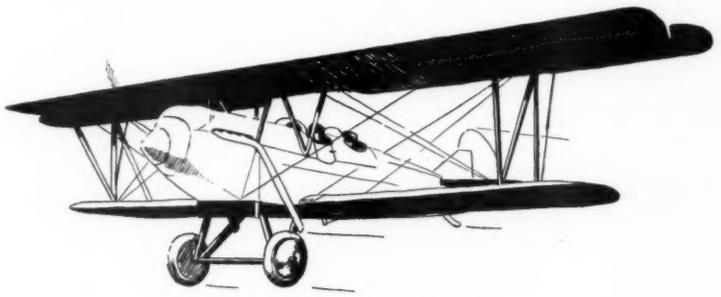

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PERFORMANCE WITH 600 LBS. USEFUL LOAD:

HIGH SPEED	100 m.p.h.
LANDING SPEED	38 m.p.h.
SERVICE CEILING	10,000 ft.

PRICE, $3,500 FLY-AWAY WICHITA.

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SERVICE CEILING	17,300 ft.

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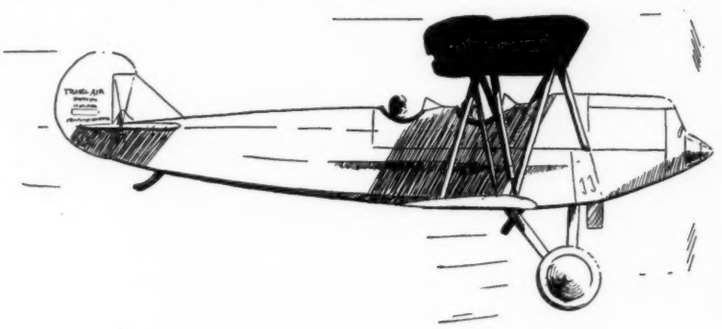

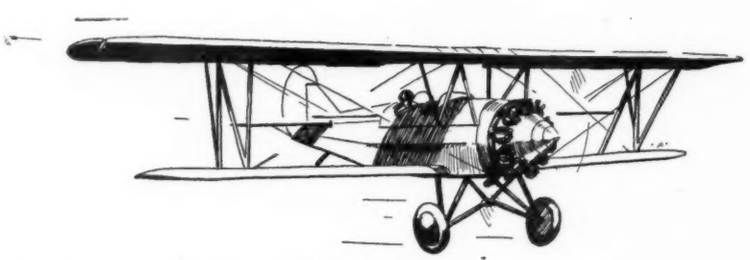

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LOW SPEED	38 m.p.h.
CEILING	20,000 ft.
CLIMB to 1300 ft.	1 min.
CLIMB to 10000 ft.	12 min.

PRICE, $9,500 FLY-AWAY WICHITA.

WE SOLICIT CUSTOM MADE AIRPLANES.

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Manufacturers of 'Travel-Air' Planes
WICHITA KANSAS

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gine working perfectly. He explained to spectators at the field that, on a first attempt to land, he could not stop the engine and was forced to climb to the elevation from which the plane nose-dived.

Bomb Dropping Under Adverse Weather Conditions

First Lieut. J. D. Barker, pilot, Tech. Sgt. Nero, Bomber, and Sgt. Willard, Radio Operator, successfully accomplished on January 28th, a bombing mission under very adverse conditions at Phillips Field, Aberdeen Proving Grounds, Md. A 2,000 lb. bomb was dropped from an altitude of 4,000 ft., despite the fact that a 50-mile wind was blowing and the temperature was approximately zero at that altitude. The Post Commander in a letter states:

"I have verbally expressed my congratulations to some of the personnel and am pleased to make the incident a matter of record, with the request that you notify all concerned of my admiration and congratulations for this most excellent feat of accomplishment under very trying conditions."

NAVY ORDERS

Ensign Joseph I. Taylor det. Rec. Ship, New York, to temp. duty Nav. A. Sta., Pensacola.

Lieut. John E. Ostrander det. Navy Yard, Washington, to Aircraft Sqdns., Battle Fleet.

Ensign Eugene L. Monagin det. Nav. A. Sta., Pensacola, to U.S.S. Eagle 58.

Lieut. Harold B. Sallada det. Inspr. of Nav. Aircraft, Eastern Dist., to Inspr. of Nav. Aircraft, Consolidated Aircraft Corp., Buffalo.

Lieut. George F. Chapline det. Aircraft Sqdns., Battle Fleet, to U.S.S. Maryland.

Lieut. Robert C. Warrack det. VF Sqdn. 1, Aircraft Sqdns., Battle Fleet, to VO Sqdn. 1, Aircraft Sqdns., U.S.S. Tennessee.

Lieut. (jg) Frank Akers det. VT Sqdn. 2, Aircraft Sqdns., Battle Flt., to U.S.S. Nevada.

Lieut. (jg) Max I. Black det. U.S.S. Williamson to temp. duty Nav. A. Sta., Pensacola.

Ensign Lester K. Rice det. Rec. Ship, New York, to temp. duty Nav. A. Sta., Pensacola.

Ch. Gun. Raymond Cole det. Nav. A. Sta., Lakehurst, to Asiatic Station.

Ensign Hickory C. Floed det. U.S.S. Nevada, to Nav. A. Sta., Pensacola.

Lieut. (jg) Daniel W. Harrigan det. Nav. A. Sta., Pensacola, to U.S.S. Niagara.

Lieut. (jg) William B. Jackson det. U.S.S. Raleigh, to temp. duty Nav. Air Sta., Pensacola.

Lieut. George E. Duffy det. Nav. A. Sta., Coco Solo, Canal Zone, to Rec. Ship, San Francisco.

Ensign Crutchfield Adair det. U.S.S. Arctic, to temp. duty Nav. A. Sta., Pensacola.

Lieut. Lisle J. Maxson detailed to duty involving flying Nav. Aircraft Factory, Navy Yard, Phila.

Lieut. Allan P. Snody det. Nav. A. Sta., Anacostia, to Bu. Aero.

Ensign Charles B. Cross det. U.S.S. Eagle 58, to temp. duty Nav. A. Sta., Pensacola.

Ensign Frank E. Deam det. U.S.S. William Jones, to temp. duty Nav. A. Sta., Pensacola.

Ensign William V. Deutermann det. U.S.S. Kennedy, to temp. duty Nav. A. Sta., Pensacola.

Marine Corps Air Orders

Sec. Lt. L. T. Burke relieved from duty N.A.S., Pensacola and assigned to duty M.B., N.A.S., Pensacola.

Sec. Lieuts. T. B. White, C. J. Chappell, L. R. Kline, C. L. Marshall detached N.A.S., San Diego, to N.A.S., Pensacola.

Sec. Lieut. J. B. McHugh detached M.B., N.A.S., Pensacola, to N.A.S., Pensacola, for aviation instruction.

First Lieuts. R. Skinner and V. M. Guymon and Sec. Lieuts. J. C. Harmon, J. R. Jones, P. A. Shiebler, W. J. Stuart, L. B. Puller, E. A. Thomas, P. E. Conradt detached M.B., Quantico, to N.A.S., Pensacola.

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2	Airspeed Indicator, Bristol, luminous dial 0-160 MPH, used	3.50
3	Air Gauge, 2″ non-luminous face 0-10 lbs., used	.25
4	Air Gauge, 2″ luminous face 0-6 lbs., new	.50
5	Air Pumps, hand brass 1½″ barrel, new	.50
6	Altimeters—Taylor 5″ luminous face, 15,000 ft., new	3.00
7	Altimeters—Taylor 5″ luminous face, 15,000 ft., used	1.00
8	Altimeters—Taylor 3½″ luminous face, 20,000 ft., new	5.00
9	Altimeters—Taylor 3½″ luminous face, 25,000 ft., used	3.00
10	Altimeters—Zenith 3½″ luminous face, 28,000 ft., new	6.00
11	Altimeters—Zenith 3½″ luminous face, 28,000 ft., used	3.00
12	Altimeters—Schneider 3½″ luminous face, 25,000 ft., new	6.00
13	Advertising novelties, toy ball, paper parachutes (box of 24)	2.00
14	Brass-Hose Tees ⅜ x ½ hose size	.10
15	Brass Shut-off Cock ¼″ P.T. with 5/16″ nut and cone connection complete	.25
16	Control Cables, Rudder and Elevator JN4D, new (each wire)	1.00
17	Clamps-Hose, wire as used on Liberty motor ¾ to 1″ (Per 100)	1.50
18	Clamps-Hose, Band ¾ to 3″ outside hose dimensions (Per 100)	2.00
19	Compass—Small Navy—new and completely overhauled	7.50
20	Copper Tacks—⅛″ long 3/16″—¼″—5/16″—⅜″ (per Pkg.)	.25
21	Cord—Shock Absorber—⅝″—White and red and white and blue—Mfg. 1923, (per ft.)	.10
22	Covers—D.H. Propeller—new army duck—perfect condition	2.50
23	Covers—150 Hisso Propeller—water-proof mohair—newly made	2.00
24	Covers—OX5 Propeller—water-proof mohair—newly made	1.00
25	Covers—JN4D Cock-pit front—water-proof mohair—newly made with fasteners	2.00
26	Covers—JN4D Cock-pit rear—water-proof mohair—newly made with fasteners	2.00
27	Covers—JN4D Motor Cover—water-proof mohair—newly made with fasteners	1.50
28	Cushions—made for JN4D Canuck—D.H.—Spad—newly made	1.00
29	Dope—in 50 gal. drums and bbls, unfit for aircraft work, (per bbl.)	5.00
30	Gas Gauges—misc. sizes for shallow tanks—all new	.25
31	Gas Gauges—misc. sizes for deep tanks—all new	.75
32	Goggles—Triplex, non-shatterable glass, new heavy frames	3.00
33	Gaskets for Liberty Motor—complete set	3.50
34	Hisso Valves, brand new—perfect condition	.50
35	Map-case—9 x 19 Leather—new—perfect condition	1.50
36	*Propellers — Hisso — 150-190 Gov't. surplus stock, various makes	10.00
37	*Propellers—OX5 90 H.P. Gov't. surplus stock, various makes	6.00
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39	Magnetos—Dixie 800 for 150-180—Hisso—brand new	30.00
40	Magneto—Berling D-81—new without breaker assembly	5.00
41	Magneto—Starting—Booster—various makes—as is	1.00
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43	Spark plugs—clip top—A. C. ⅞ x 18 Threads—new for automobile	.25
44	Tachometers—Warner 0-2000—all new	2.50
45	OX5 Jet wrench, new	.50
46	Wire Manifolds, with all wires and terminals for OX5 new	4.00

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47	Wire Manifolds, with all wires and terminals for OXX6, new	4.00
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49	Tires—new stock—Goodyear Cord 900 x 200 clincher	35.00
50	Tires—new stock—Goodyear Cord 32 x 6 straight side	25.00
51	Motors—Siemen-Halske, 200 H.P. Rotaries, original boxes, one is less equipment	2 for 750.00
52	Motors—LeRhone, 80 H.P. original boxes with tools and spares	90.00
53	Liberty 12 High Compression—run only few hours, perfect condition	1100.00
54	Struts—Wing—inner or outer with fittings JN4D or Canuck, used	.50
55	Struts—Fuselage Station No. 3 vertical JN4D or B, new	.25
56	Struts—Aileron—long diagonal Canuck, new	.50
57	Struts—Aileron—short straight Canuck, new	.50
58	Struts—Aileron—short spacer Curtiss H, new	.50
59	Struts—Center Section—JN4D—Canuck, new	.50
60	Struts—Cabane Mast—JN4D—Canuck, new	.25
61	Struts—Landing Gear—Ash—old style—Canuck, new	.25
62	*Spreader Board Struts—two-piece—Canuck, new	.50
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65	*Landing Gear—complete less wheels—Ackerman—fits JN4D or Canuck, new	10.00
66	*Landing Gear—complete less wheels for Bristol Fighter	10.00
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68	Wing skid—Hickory or Metal JN4D or Canuck, new	1.25
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70	Engine Bearers—JN4D using Hisso motor, new	1.00
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PUBLISHER'S NEWS LETTER

The intense interest concerning regulation of aviation increases daily if the mail received is any indication. No subject, not even the separate air force proposal, has seemed to stir up such wide differences of opinion. Letters, of eight and ten typewritten pages, come with requests that they be printed in full. Of course, it is more helpful to the cause of aviation to have many views of pilots and operators printed rather than extended views of only a few. For this reason we have had to omit many pages of extremely interesting observations. As any continued repetition of the same subject becomes tiresome, we shall print a few more pages of these opinions and then stop.

* * * *

While there is no certainty about any constructive legislation dealing with aircraft passing Congress, this session, it may be well to anticipate the passage of a regulatory bill and make a suggestion that may be helpful. Assuming that some bill is passed placing the control of aeronautical inspection and regulation in the Department of Commerce, the first step to be taken is of the greatest importance. In outlining the policy of the Department, in case this added responsibility was placed upon it, Assistant Secretary Drake, in a letter to AVIATION, stated that a conference of all those interested would be held before any decisions were made. Should such a meeting take place, we feel that it is of the greatest importance to have all groups represented.

* * * *

There are four distinct interests that should be represented at any such gathering: the manufacturers of commercial aircraft, air transport companies, the aerial service operators and the commercial pilots. Suppose at such a meeting, representatives of each of these groups were consulted and their opinions considered, it would certainly go far toward making any regulations more practical.

If such pilots as our own Cy Caldwell, the ever-present Casey Jones, the old reliable Eddie Stinson and another standby, Bob Hewitt of Philadelphia, should be heard for the commercial fliers, it seems to us that everyone would feel that this group would be well represented.

Then would come the aerial service operators and no one thinks of this class without having in mind E. A. Johnson of Dayton, Tony Yackey of Chicago, Rusty Campbell of Moline. With these old timers watching out for the interests of the fixed base operators, their interests would be cared for. For the air transport group, of course, Col. Paul Henderson of the National Air Transport would head any such delegation. If the Western lines were represented by Mr. Harris M. Hanshue and Walter T. Varney of the new California air transport companies, these new operators would have excellent representation. For the manufacturers of commercial aircraft, a trio composed of Frank Russell who sells Carrier Pigeons and Larks, E. Junkin who makes the Waco, and W. D. Mayo of the Ford air transport would complete the conference.

* * * *

With such men to advise him, Secretary Hoover would start right and could carry out the formulation of any regulations with every possible interest considered. Such a gathering would establish confidence in a way nothing else could. So we add, if there is to be regulation this year, start with a conference composed of the leaders of the four groups and do not let this vitally important matter fall into the hands of the so-called expert who is usually riding his hobby.

* * * *

A very legitimate complaint has been received from one of our advertisers. He writes that he has recently received from two young boys requests for catalogues and specifications for his airplanes. As the aircraft that he manufactures sell at around $15,000 he feels that it is a waste of time for the writers as well as himself to have such requests come from persons who are not prospective purchasers. He says: "there is no question in my mind that you will find that it will be a deterrent from advertising, especially by those who are doing business with the government. If these boys would know that manufacturers are not able to give out information in circulars of government machines, I think many of them might be dissuaded from bothering the manufacturers." So here is the hope expressed that if any boys read AVIATION and we think there are not a great many, that they will, in writing, ask only for any catalogue of commercial aircraft.—L.D.G.

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